Configuring Line Services

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About This Guide

If you are responsible for configuring and managing Bay Networks™ routers, you need to read this guide. *Configuring Line Services* describes how to customize the Bay Networks router software to configure line services, including.

- Instructions for accessing configurable line details with Site Manager (Chapter 1)
- An overview of LAN and WAN line media and protocols (Chapter 2)
- Instructions for customizing the line parameters for
  - -- Ethernet, FDDI, and Token Ring lines (Chapter 3)
  - -- ATM, E1, HSSI, and T1 lines (Chapter 4)
  - -- Synchronous and asynchronous lines (Chapter 5)
  - -- MCE1 and MCT1 lines (Chapter 6)
- Instructions for configuring multiline services (Chapter 7)
- Instructions for using the Line Resource Manager to manage reservable traffic (Chapter 8)
- A description of all line parameters that are configurable using Site Manager (Appendix A)
- A list of line parameter defaults (Appendix B)
- Instructions for testing MCE1 and MCT1 lines (Appendix C)

Written for system and network managers, this guide assumes that

- You have a working knowledge of Site Manager.
- You have a working knowledge of your network's physical layer components.

Before You Begin

Before using this guide, you must complete the following procedures. For a new router:

- Install the router (refer to the installation manual that came with your router).
- Connect the router to the network and create a pilot configuration file (refer to *Quick-Starting Routers, Connecting AN and ANH Systems to a Network,* or *Connecting ASN Routers to a Network)*.

Make sure that you are running the latest version of Bay Networks Site Manager and router software. For instructions, refer to *Upgrading Routers from Version 7–10.xx to Version 11.0*.

Conventions

bold text	Indicates text that you need to enter, command names, and buttons in menu paths. Example: Enter **wfsm &** Example: Use the **dinfo** command. Example: ATM DXI > Interfaces > **PVCs** identifies the PVCs button in the window that appears when you select the Interfaces option from the ATM DXI menu.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (“ ”)	Indicate the title of a chapter or section within a book.
`screen text`	Indicates data that appears on the screen. Example: `Set Bay Networks Trap Monitor Filters`
separator (>)	Separates menu and option names in instructions and internal pin-to-pin wire connections. Example: Protocols > AppleTalk identifies the AppleTalk option in the Protocols menu.

Acronyms

AMI	alternate mask inversion
ANSI	American National Standards Institute
ATM	asynchronous transfer mode
B8ZS	bipolar with 8-zero substitution
BERT	bit error rate test
BofL	Breath of Life (message)
CRC	cyclic redundancy check
CRM	Circuit Resource Manager
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
CTS	clear to send
FDDI	Fiber Distributed Data Interface
FDL	facility data link
HDLC	high-level data link control
HSSI	High-speed Serial Interface
IP	Internet Protocol
LAPB	Link Access Procedure-Balanced
LRM	Line Resource Manager
MAC	Media Access Control
MAU	multistation access unit
MCE1	Multichannel E1
MCT1	Multichannel T1
MIB	management information base
MTU	maximum transmission unit
NCP	Network Control Protocol
NLPID	Network Layer Protocol Identifier
NSAP	Network Service Access Point
OSPF	Open Shortest Path First
PCM	Physical Connection Management (FDDI)
PDU	Protocol Data Unit
PHY	Physical Layer Protocol (FDDI)
PMD	Physical Layer Media Dependent (FDDI)

PPP	Point-to-Point Protocol
PTT	Post Telephone and Telegraph
PVC	permanent virtual circuit
QoS	quality of service
RIP	Routing Information Protocol
RMT	Ring Management (FDDI)
RTS	request to send
SAP	Service Access Point
SDH	synchronous digital hierarchy
SIF	status information frame
SMDS	switched multimegabit data service
SMT	Station Management (FDDI)
SNAP	Subnetwork Access Protocol
SNMP	Simple Network Management Protocol
SONET	Synchronous Optical Network
SR	source routing
SRF	status report frame
ST2	Stream Protocol 2
SVC	switched virtual circuit
TCP/IP	Transmission Control Protocol/Internet Protocol
TTRT	target token rotation time

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Sydney, Australia	(612) 9927-8800	(612) 9927-8811
Tokyo, Japan	(81) 3-5402-0180	(81) 3-5402-0173

Chapter 1
Getting Started

This chapter describes how to access the physical and data link layer (line) services for the configured circuits on a Bay Networks router.

Note: In the OSI internetworking model, the *physical layer* manages the transmission of bits across the physical media (cable or modem interface); a physical layer protocol defines the electrical and mechanical interface. The *data link layer* defines the procedures for transferring data accurately and reliably across the physical layer.

This guide assumes that someone has already added the network interfaces to the router configuration file by configuring a circuit on the hardware connectors and enabling bridging/routing services. See *Configuring Routers* for information about these tasks.

What's the Default?

With the exception of multichannel circuits (MCE1 and MCT1), the router software automatically sets default values for the line service parameters when you add a network interface. See Appendix B for a list of the default line service parameter values for each circuit type.

Line defaults are suitable for many networks; however, you can use the Configuration Manager to customize these settings based on your network composition and requirements. Chapters 3 through 6 provide information about editing the protocol-specific line parameters.

Accessing Line Services with Site Manager

This section describes how to access the Site Manager windows that contain physical layer (line) services for the configured circuits on a Bay Networks router.

To access line parameters:

1. **Start at the Configuration Manager window (Figure 1-1).**

Note: For many circuit types, you can bypass Steps 2 through 6 by clicking on the configured connector in the Configuration Manager window, and then clicking on *Edit Line* in the popup window.

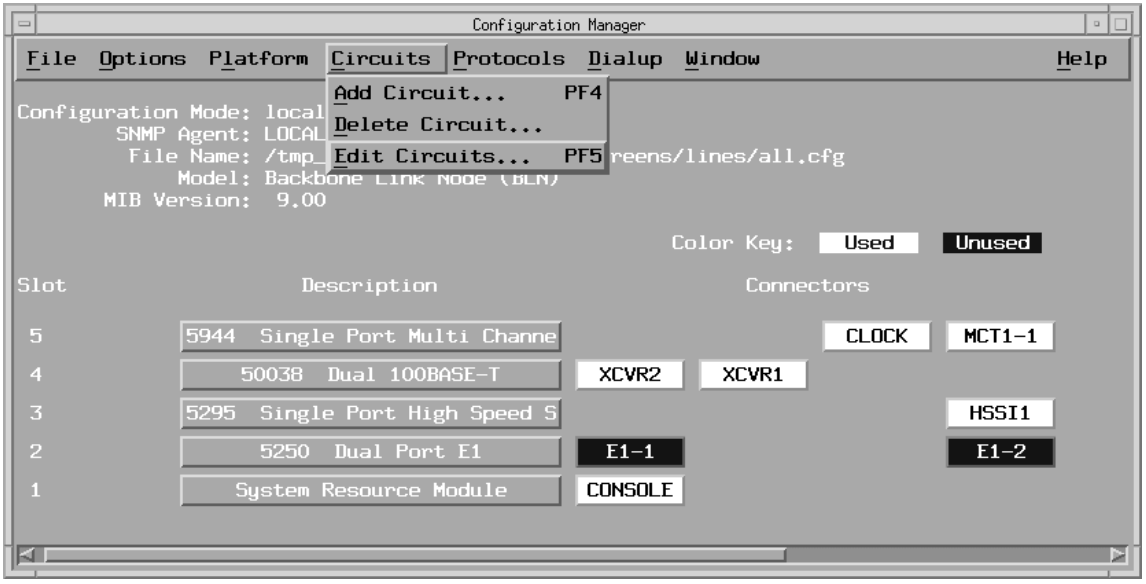

Figure 1-1. Configuration Manager Window

2. **Select Circuits > Edit Circuits.**

   The Circuit List window appears (Figure 1-2).

Figure 1-2. Circuit List Window

3. **Select the circuit for which you want to edit line service parameters.**

   Table 1-1 lists the Configuration Manager abbreviation for each circuit type.

Table 1-1. Site Manager Abbreviations for Circuit Types

Letter Designator	Circuit Type
E	Ethernet
E1	E1
F	FDDI
H	HSSI
MCE1	MCE1
MCT1	MCT1
O	Token Ring
S	Synchronous
T1	T1

4. **Click on Edit.**

   The Circuit Definition window appears (Figure 1-3).

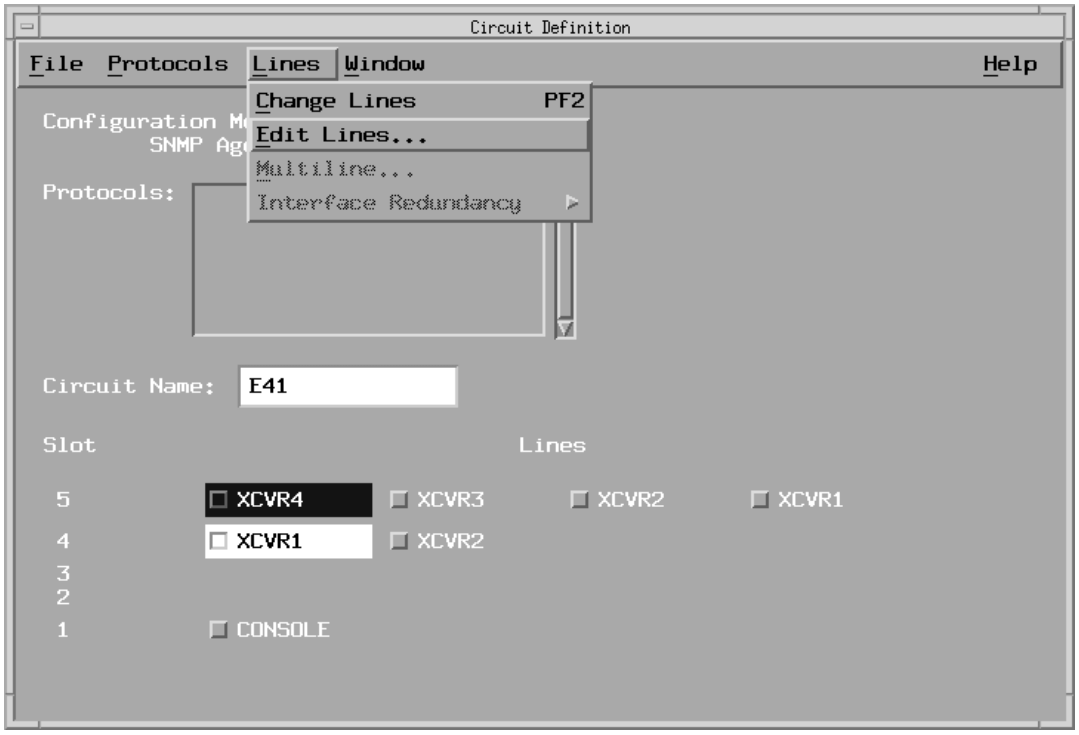

Figure 1-3. Circuit Definition Window

5. **Select Lines > Edit Lines.**

   The Edit Lines window appears (Figure 1-4). This window lists the existing lines by slot number and connector name.

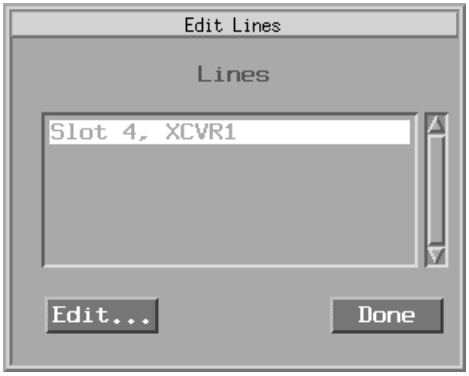

Figure 1-4. Edit Lines Window

6. **Select the line you want to edit and click on Edit.**

   Depending on the type of circuit that you selected in Step 3, the Configuration Manager displays the window that allows you to modify the circuit's line details.

7. **Edit the line attributes.**

   The type of line determines how you edit line details. Chapters 3 through 6 provide information on editing line parameters for specific circuit types (Table 1-2).

Table 1-2. Line Types and Corresponding Chapters

Line Type	Go To
Ethernet, FDDI, Token Ring	Chapter 3
ATM FRE®-2, ATM ARE, E1, HSSI, T1	Chapter 4
Synchronous, LAPB, Asynchronous	Chapter 5
MCE1	Chapter 6
MCT1	Chapter 6

Chapter 2
About Line Protocols

This chapter provides overview information on LAN and WAN media and their data link layer protocols in the following sections.

- Overview of LAN Protocols
- Overview of WAN Protocols

Overview of LAN Protocols

To support LAN topologies, you can configure a router with Ethernet, FDDI, or Token Ring circuits. This section provides overview information about these LAN technologies:

- Ethernet Overview
- FDDI Overview
- Token Ring Overview

Ethernet Overview

Ethernet is a 10-megabit/second (Mb/s) or 100-Mb/s LAN that uses the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) protocol to control access to the physical wiring (*media*).

Data Flow

When a node on an Ethernet LAN (*endstation)* transmits data, every endstation on the LAN receives the data. Each endstation checks each data unit to see whether the destination address matches its own address. If the addresses match, the endstation accepts and processes the packet. If they do not match, it disregards the packet.

Medium Access Control

Endstations use CSMA/CD to monitor the media and wait until it is idle before transmitting data.

Carrier Sense Multiple Access

Before attempting to transmit a message, an endstation determines whether or not another endstation is transmitting a message on the media. If the media is available, the endstation transmits the message; if not, the endstation delays its transmission until the other endstation has finished sending.

Collision Detection

If two endstations transmit data simultaneously, a collision occurs and the result is a composite, garbled message. All endstations on the network, including the transmitting endstations, detect the collision and ignore the message. Each endstation that wants to transmit waits a random amount of time and then attempts to transmit again. The random transmission delays reduce the probability that the endstations will transmit simultaneously again.

Ethernet Frame Formats

There are two MAC-layer frame format specifications used in Ethernet LANs. The first specification is called Ethernet. The second, standardized by the IEEE, is called 802.3. One way that they differ is in message format (Figure 2-1). Instead of a Length field in the MAC-layer header, Ethernet messages include a Type field, indicating which higher-layer protocol is used in the Data field.

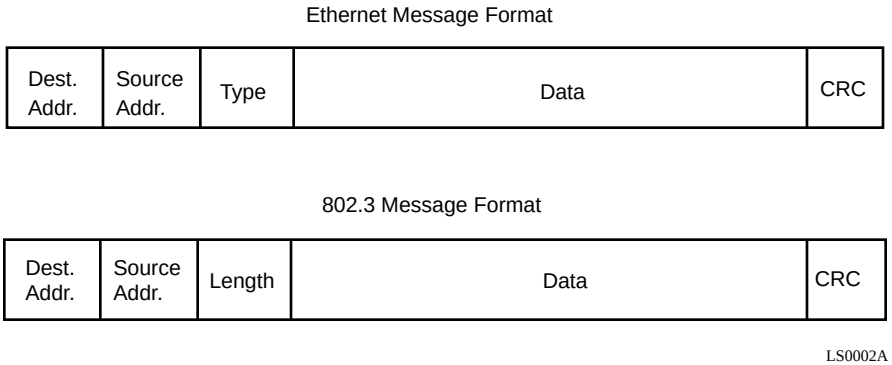

Figure 2-1. Ethernet and 802.3 Message Formats

The Bay Networks Ethernet/802.3 interface supports IEEE 802.3 and Version 1.0/2.0 Ethernet frame formats.

Ethernet Media

A bisynchronous10-Mb/s Ethernet LAN (10Base-T) uses thick or thin Ethernet (coaxial cable) or Category 3 twisted-pair cable.

The bisynchronous100-Mb/s Ethernet LAN (100Base-T, sometimes called *fast Ethernet*) uses three different media interfaces:

- 100Base-TX uses two pairs of unshielded twisted-pair wires and allows both full-duplex and half-duplex operation.
- 100Base-FX uses fiber cabling that supports half- and full-duplex operation.
- 100Base-T4 uses new physical layer signals to run over four pairs of Category 3 unshielded twisted-pair wires. The signals use all four wire pairs, so only half-duplex operation is supported.

Each 100Base-T port supports 100Base-TX or MII physical interfaces. The integral 100Base-TX transceiver enables Category 5 twisted-pair wire to be directly connected to its RJ-45 connector. The MII interface enables external transceivers to be attached to the MII connector. This allows the use of a variety of different transmission media, such as Category 3 unshielded twisted-pair wire (100Base-T4) and fiber-optic (100Base-F) cable.

When using the 100Base-T Link Module, larger packet sizes yield better performance than smaller packet sizes. In general, you should configure your application to use the largest packet size possible.

Note: To obtain the highest aggregate throughput, use only one of the two ports on the 100Base-T Link Module. Demanding high throughput from both ports simultaneously will result in some packet loss and this may decrease the performance of sensitive applications.

Ethernet Topologies

Thick and thin Ethernet LANs use a bus topology, in which devices connect directly to the backbone at both the physical and logical levels (Figure 2-2).

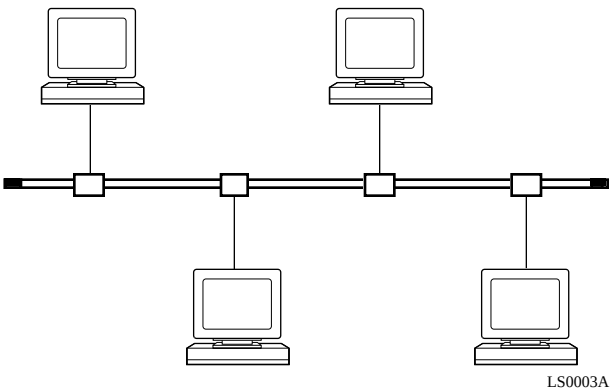

Figure 2-2. Ethernet LAN, Bus Topology

Physically, an Ethernet LAN using twisted-pair cable comprises a string of star topologies, in which devices connect to a central concentrator (Figure 2-3). Logically, however, the cabling still has a bus topology.

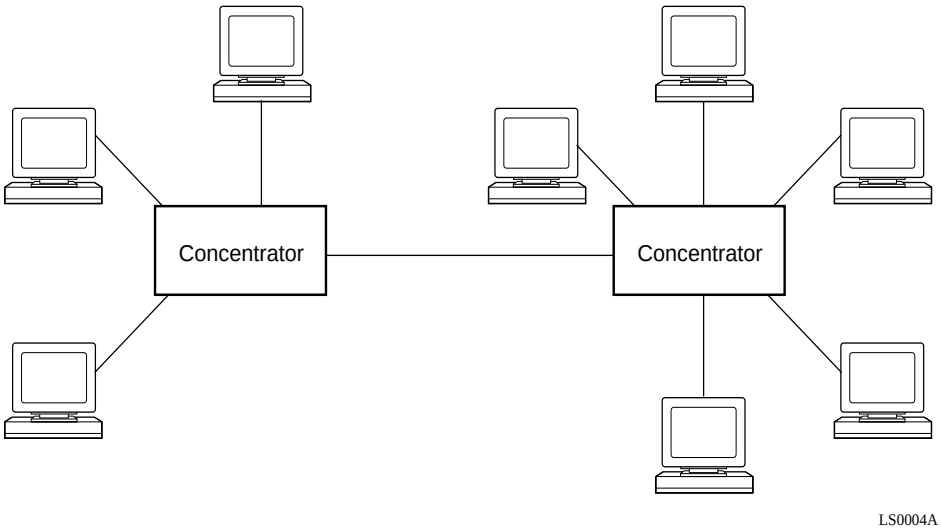

Figure 2-3. Ethernet LAN, Star Topology

FDDI Overview

Fiber Distributed Data Interface (FDDI) comprises a set of ANSI/ISO standards that define a 100-Mb/s, timed-token-passing LAN of up to 500 nodes. FDDI is used most often for workgroup, backbone, and backend network configurations that require high bandwidth and performance.

Topics in this overview include

- The FDDI Standard
- FDDI Dual Counter-Rotating Ring Architecture
- FDDI Ring Operation
- FDDI SMT
- FDDI Ring Maintenance
- FDDI Hardware

The FDDI Standard

FDDI uses a dual counter-rotating ring topology for fault recovery and sophisticated encoding techniques to ensure data integrity. The FDDI standard specifies that the total length of the fiber-optic cabling used to connect the nodes may not exceed 200 km, or 100 km per ring.

The FDDI standards consist of the following entities:

- Physical Layer Media Dependent (PMD)

  The PMD standard defines the physical characteristics of the media interface connectors and the cabling, and the services necessary for transmitting signals between nodes.

- Physical Layer Protocol (PHY)

  The PHY standard defines the rules for encoding and framing data for transmission, clocking requirements, and line states.

- Media Access Control (MAC)

  The MAC standard defines the FDDI timed-token protocol, frame and token construction and transmission on the FDDI ring, ring initialization, and fault isolation.

- Station Management (SMT)

  The SMT standard defines the protocols for managing the PMD, the PHY, and the MAC components of FDDI. The SMT protocols monitor and control the activity of each node on the ring.

Figure 2-4 shows the relationship of the four FDDI standards.

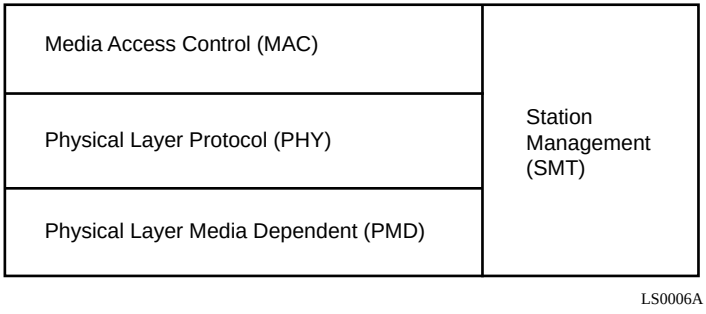

Figure 2-4. Relationship of FDDI Standards

FDDI Dual Counter-Rotating Ring Architecture

FDDI LANs comprise two independent, counter-rotating rings: a *primary* ring and a *secondary* ring. Data flows in opposite directions on the rings. Both rings can carry data; however, in high-bandwidth applications, Bay Networks specifies that the primary ring transmits data and the secondary ring is a backup device.

The counter-rotating ring architecture prevents data loss in the event of a link failure, a node failure, or the failure of both the primary and secondary links between any two nodes, as follows:

- If a link on the primary ring fails, the secondary ring transmits the data.
- If a node or corresponding links on both the primary and secondary rings fail, one ring wraps to the other around the faulty components, forming a single ring (Figures 2-5 and 2-6).

When the component can function again, the architecture reverts to dual-ring.

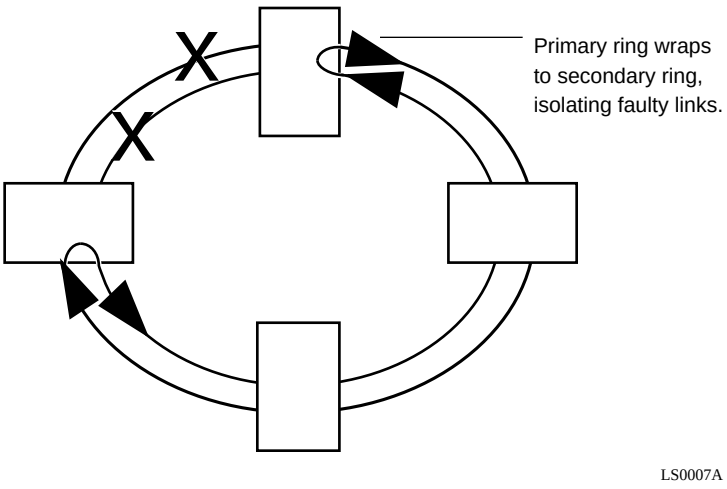

Figure 2-5. Failure of Corresponding Links on Both Rings

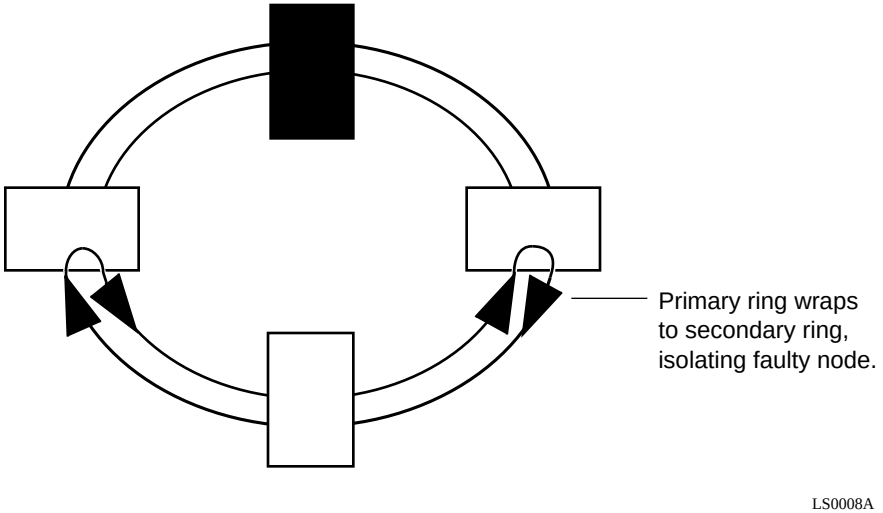

Figure 2-6. Failure of Node on Ring

FDDI Ring Operation

An FDDI ring consists of nodes in a ring architecture. There are two classes of nodes: *stations* (a node with no master ports), and *concentrators* (a node with master ports).

The FDDI standards define two types of stations: single attachment stations (SAS) and dual attachment stations (DAS). The SAS connects to only one ring; it cannot wrap the ring in case of a fault. The DAS connects to both the primary and secondary rings. The Bay Networks router is an example of a DAS.

FDDI initializes the ring and transmits data as follows:

1. The nodes on the ring establish connections with their neighbors.

   The Connection Management (CMT) portion of SMT controls this process, as described in "FDDI SMT," later in this chapter.

2. The nodes negotiate the target token rotation time (TTRT), using the claim token process.

The TTRT is the value that the MAC sublayer uses to time its operations. The claim token process determines which node initializes the ring (generates the token). The node with the lowest bid for the TTRT wins the right to generate the token.

3. After a node has initialized the ring, the ring begins to operate in steady state.

   In steady state, the nodes exchange frames using the Timed-Token Protocol (TTP). The TTP defines how the TTRT is set, the length of time a node can hold the token, and how a node initializes the ring. The ring remains in steady state until a new claim token process occurs (for example, when a new node joins the ring).

4. The nodes pass the token from one node to another on the FDDI ring.
5. A node on the ring captures the token when it wants to transmit data, and then transmits data to its downstream neighbor.
6. Each node reads and repeats frames as it receives them. If a node detects an error in a frame, the node sets an error indicator.
7. A frame circulates on the ring until it reaches the node that first transmitted it. That node removes the frame from the ring.
8. When the first node has sent all of its frames, or exceeded the available transmission time, it releases the token back to the ring.

Station Timers

Each node uses three timers to regulate its operation in the ring:

- Token rotation timer (TRT)
- Token holding timer (THT)
- Valid transmission timer (TVX)

The TRT times the period between the receipt of tokens. TRT is set to varying values, depending on the state of the ring. During steady-state operation, the TRT expires when the actual token rotation time exceeds the TTRT.

The THT controls the length of time that a node can hold the token to transmit frames. The value of the THT is the difference between the arrival time of the token and the TTRT.

The TVX times the period between valid transmissions on the ring. When the node receives a valid frame or token, the TVX is reset. If the TVX expires, the node starts a ring initialization sequence to restore the ring to proper operation.

FDDI Ring Maintenance

Each node is responsible for monitoring the integrity of the ring. By using the TVX, nodes can detect a break in ring activity. If the interval between token receptions exceeds the value of the TVX, the node reports an error condition and initiates the claim process to restore ring operation.

If it cannot generate a token, the node that detected the problem initiates *beacon* frames. Beacon frames indicate to the other nodes that the ring is broken. If the beacon transmission exceeds the value set in the stuck beacon timer (controlled by the Ring Management [RMT] portion of SMT), RMT attempts to restore the ring to normal operation.

If the ring does not return to normal operation in a specified period of time, RMT initiates a *trace*. A trace is a diagnostic function that isolates a fault on the ring. For more information about RMT, see the next section.

FDDI SMT

Bay Networks routers support Version 7.2 of the SMT protocol. SMT is a low-level protocol that manages the FDDI functions provided by the PMD, the PHY, and the MAC. SMT can run only on a single FDDI ring and can manage only the FDDI components and functions within a node.

SMT contains three components:

- Connection Management (CMT)
- Ring Management (RMT)
- SMT frame services

CMT

CMT performs these functions:

- Inserts and removes stations at the PHY level
- Connects PHYs and MACs with a node
- Uses trace diagnostics to identify and isolate a faulty component

- Manages the physical connection between adjacent nodes, including
  - -- Testing the quality of the link before establishing a connection
  - -- Establishing a connection
  - -- Monitoring link errors continuously when the ring is operational

RMT

RMT receives status information from the MAC and CMT, reporting this information to SMT and higher-level processes (for example, SNMP). It detects stuck beacon conditions and duplicate addresses, and determines when the MAC is available for transmitting frames. Duplicate addresses prevent the proper operation of the ring.

SMT Frame Services

SMT frame services manage and control the FDDI network and the nodes on the network. Different SMT frame classes and types implement these services. *Frame class* identifies the function that the frame performs. *Frame type* specifies whether the frame is an announcement, a request, or a response to a request. FDDI SMT frames are limited to a single FDDI ring. The frames cannot move across WANs or across multiple FDDI rings. The frames do not manage functions outside FDDI.

Table 2-1 lists the SMT frames that Bay Networks routers support.

Table 2-1. SMT Frame Classes and Types

Frame Class	Frame Type
Neighbor Information Frames (NIF)	Request/Response
Status Information Frames (SIF)	Response
Echo Frames (ECF)	Response
Request Denied Frames (RDF)	Response
Status Report Frames (SRF)	Announcement
Parameter Management Frames (PMF) (PMF Get Response frames only)	Response

Neighbor Information Frames identify the upstream and downstream neighbors of each node. After the nodes learn the addresses of their upstream neighbors, you can use the addresses to create a logical map showing the order in which nodes appear in the token path. A Bay Networks station issues a response to the sender of a NIF frame and generates NIF requests as part of the neighbor notification process.

Status Information Frames exchange information about each node, including the status of each port on the node. You can use SIFs to create a physical map showing the position of each station in the FDDI network. There are two types of SIFs:

- SIF configuration frames, which show the configuration information of a node.
- SIF operation frames, which show the operational information of a node. A Bay Networks station issues a response to the sender of a SIF request frame.

Echo Frames verify that nodes on an FDDI network can communicate with each other. Echo frames are used to test connectivity only. A node sends an echo request (which is a directed packet) to another FDDI node. The receiver of the echo request copies the data that appears in the information field of the frame and transmits an echo response frame back to the originator of the echo request. A Bay Networks station issues a response to the sender of an echo request frame.

Request Denied Frames deny requests from the network. If the SMT agent receives a frame with an unsupported SMT version or an unknown frame type, it sends a Request Denied frame. A Bay Networks station issues an RDF Response frame.

Status Report Frames allow the Status Report protocol to report node conditions and events. A *condition* is when a node enters a specific state (for example, duplicate address detected). An *event* is an immediate occurrence (for example, the generation of a trace). A Bay Networks station issues an SRF announcement frame.

Parameter Management Frames allow the Parameter Management protocol to manage an FDDI node. A management station performs operations on the MIB attributes of a node by exchanging frames between the management station and the FDDI node. To obtain an attribute, the management station initiates a PMF Get Request frame. The FDDI node to which the PMF Get Request frame was sent responds by initiating a PMF Get Response frame. A Bay Networks station issues a response to the sender of a PMF Get Request frame.

FDDI Hardware

Bay Networks provides FDDI interfaces for multimode or single-mode 100 Mb/s FDDI LANs, including hybrid FDDI link modules for both single-mode and multimode fiber interfaces.

All FDDI interfaces support a Class A dual attachment or a dual homing Class B single attachment. The FDDI link and net modules include two Media Interface Connector (MIC) plugs as well as one RJ-11 connector for attachment to an optional external optical bypass unit.

Token Ring Overview

Token Ring is a 4-Mb/s or 16-Mb/s token-passing, baseband LAN that operates in a ring topology. Token Ring conforms to the IEEE 802.5 standard. A Token Ring LAN uses shielded or unshielded twisted-pair cable.

Overview topics in this section include:

- Token Ring Topology
- Data Flow and Media Access Control

The Token Ring/802.5 interface is IEEE 802.5-compatible with IEEE 802.2 Type 1 (connectionless) and Type 2 (connection-oriented) support. You can configure the interface to operate at 4 or 16 Mb/s to respond to different network requirements. The interface supports IBM Type 1 and Type 3 cabling.

Token Ring Topology

Stations on a Token Ring network attach to the network using a multistation access unit (MAU). Although the Token Ring is logically a ring, it is physically a star, with devices radiating from each MAU (Figure 2-7).

MAUs connect a limited number of devices, typically two, four, or eight. You can extend the Token Ring by connecting the Ring Out (RO) port of one MAU to the Ring In (RI) port of the next (Figure 2-7). You must complete the ring by connecting all RI and RO ports.

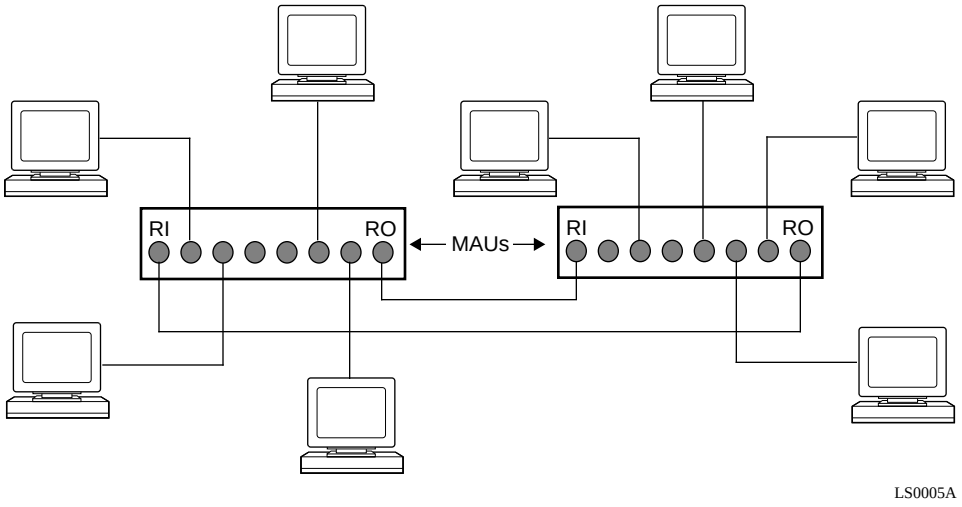

Figure 2-7. Token Ring LAN

Data Flow and Media Access Control

Devices on a Token Ring network get access to the media through token passing. Token and data pass to each station on the ring, as follows:

1. The devices pass the token around the ring until one of them needs to transmit data.
2. The device that wants to transmit takes the token and replaces it with a frame.
3. Each device passes the frame to the next device, until the frame reaches its destination.
4. As the frame passes to the intended recipient, the recipient sets certain bits in the frame to indicate that it received the frame.
5. The original sender of the frame strips the frame data off the ring and issues a new token.

Overview of WAN Protocols

There are several types of router circuits that support communication between two points on a WAN. This section provides information on these WAN circuits:

- E1 Overview
- HSSI Overview
- ISDN Overview
- Link Access Procedure Balanced (LAPB) Protocol Overview
- MCE1 and MCT1 Overview
- Synchronous Overview
- T1 Overview

Note: For information on ATM ARE or FRE-2 circuits, see the *Configuring ATM Services* guide. For information on ATM Data Exchange Interface (DXI), see *Configuring ATM DXI Services.* ATM DXI operates over HSSI or synchronous interfaces.

E1 Overview

E1 services use digital signals to allow two pairs of wires to carry 30 voice or data transmissions. Table 2-3 shows the specification for an E1 line.

Table 2-2. Specification for E1 Line

Attribute	Value
Framing rate	8000 frames/s
Channels per frame	32
Line speed	2.048 Mb/s

E1 services (2.048 CEPT) are the European equivalent of T1 services, and operate in a similar fashion. See “T1 Overview” for more information.

HSSI Overview

The High-Speed Serial Interface (HSSI) provides a high-speed interface supporting bandwidth-intensive applications, such as host-to-host links, disaster recovery, and image processing. HSSI eliminates the typical bottleneck created by differences between LAN and WAN speeds.

The HSSI interface supports full-duplex synchronous bit rates from 300 Kb/s through to 52 Mb/s. HSSI provides connection to high-speed circuits such as T3/ES and SONET OC-1, and to high-speed WAN switching services including Frame Relay, SMDS, and ATM DXI.

HSSI link module also supports a remote line loopback mechanism to test circuit integrity. The DSU (DCE) signals and requests a loopback from the router (data terminal equipment or DTE) to check the DTE-to-DCE connection. This loopback test speeds failure isolation and enhances network reliability.

ISDN Overview

Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) interface is an IEEE 802.9-compliant interface that allows an access node (AN, ASN, or ARN) to be directly connected to an ISDN switched services network. This interface eliminates the need for an external ISDN terminal adapter (TA) when attaching to an ISDN network. The ISDN BRI provides two 64-Kb/s B-channels for data and one 16-Kb/s D-channel for signaling.

ISDN Primary Rate Interface (PRI) software interface connects a BLN and BCN directly to an ISDN switched service network via a Bay Networks Multichannel T1 (MCT1) or Multichannel E1 (MCE1) link module. Like the ISDN BRI, this interface eliminates the need for an external ISDN adapter when attaching a Bay Networks router to an ISDN network.

ISDN PRI can connect to up to 30 remote locations over an ISDN switched network and complies with the North American and European ISDN PRI standards. The North American standard provides 23 B-channels of 64 Kb/s each and one 64 Kb/s D-channel. The European standard provides 30 B-channels plus one D-channel.

Link Access Procedure Balanced (LAPB) Protocol Overview

The Link Access Procedure Balanced (LAPB) protocol is a version of the High-level Data Link Control (HDLC) protocol, which is an OSI link layer standard. Bay Networks routers use the services of LAPB to initialize the link between the router and the local DCE device, and to frame X.25 data packets before transmitting them to the DCE.

X.25 uses the LAPB protocol at the data link layer to

- Initialize the link between the DTE and the local DCE device
- Frame X.25 data packets before transmitting them to the DCE

The LAPB information field contains the X.25 packets. Once an X.25 packet reaches the destination router, the LAPB protocol strips away the LAPB frame and delivers the packet to the network layer for further processing. For detailed information on X.25, refer to *Configuring X.25 Services*.

LAPB Implementation on Bay Networks Routers

When you configure X.25 on a Bay Networks AN® or ASN™ router, or on an Octal Sync link module line, Site Manager automatically configures LAPB.

The implementation of the LAPB protocol on the AN and ASN routers, and on BN® and LN® routers with Octal Sync, differs from that on other Bay Networks routers. On the AN and ASN routers and BN and LN routers with Octal Sync, LAPB is implemented in software in routers that use the QUICC 68360 driver. On the other routers, LAPB is implemented in the hardware using the MK5025 chip.

MCE1 and MCT1 Overview

Multichannel E1 (MCE1) and T1 (MCT1) interfaces provide high-density access to digital access and crossconnect systems (DACS). MCE1 also provides a variety of international PTT and Telecommunications Administration services.

Multichannel interfaces enable data to be segmented into multiple DS-0 connections. This allows you to maximizes remote link capacity by allowing individual DS-0 channels to be used separately or grouped. You can form Fractional T1 channels by grouping MCT1 DS-0s.

An MCT1 interface can transmit or receive up to 24 DS-0 (56/64 Kb/s) channels per DS-1 frame over leased point-to-point links. The MCE1 interface can transmit or receive up to 30 DS-0s (64 Kb/s).

The MCE1 and MCT1both include an integrated DSU/CSU for direct connection to an E1 or T1 network. The interfaces provide integrated support for loopback testing and basic error rate test (BERT) line testing.

Synchronous Overview

A synchronous interface connects a Bay Networks router or switch to a DCE, such as DSUs, CSUs, and modems. The synchronous interface supports a range of physical connections including V.35, RS232, RS449/422 balanced, and X.21.

The synchronous interface supports many WAN software services, including PPP, X.25, Frame Relay, SMDS, HDLC encapsulation, and ATM DXI. A single synchronous interface operates from 1200 b/s to a maximum of 2.048 Mb/s, full duplex.

You can configure synchronous interfaces to integrate IBM SDLC traffic into the internetwork. Traffic is integrated by connecting local or remote IBM equipment directly to the Synchronous interface and using either the DLSw for SDLC or Transparent Sync Pass-Thru features.

The synchronous interface supports both leased and dial-up circuits. Dial Back-up, Dial-on-Demand, and Bandwidth-on-Demand using Raise DTR and V.25bis dial signaling are supported over V.35, RS232, and X.21 interfaces.

T1 Overview

T1 services use digital signals to allow two pairs of wires to carry 24 voice or data transmissions. Table 2-3 shows the specification for a T1 line.

Table 2-3. Specification for T1 Line

Attribute	Value
Framing rate	8000 frames/s
Channels per frame	24
Line speed	1.544 Mb/s

Frame Formats

T1 uses two types of frame formats:

- D4
- Extended superframe (ESF)

D4

D4 is the original T1 frame format. A D4 frame (Figure 2-8) comprises

- One framing bit
- A *DS0 timeslot* for each channel on the line

  A DS0 timeslot is an 8-bit sample from a channel.

A T1 line generates 8000 D4 frames/second.

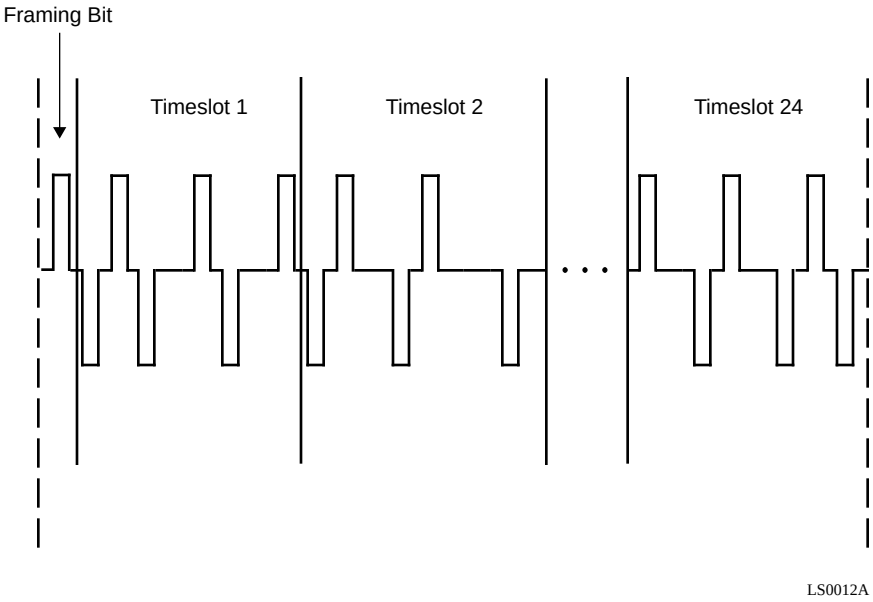

Figure 2-8. D4 Frame

ESF

The D4 format does not allow testing of a digital line while the line is in use. To allow such testing, you can use the extended superframe (ESF).

An ESF comprises 24 D4 frames (Figure 2-9). As each D4 frame contains a framing bit, an ESF has 24 framing bits that it uses for the following purposes:

- Synchronization (6 bits)
- Error checking (6-bit cyclic redundancy check)
- Diagnostic data channel (12 bits)

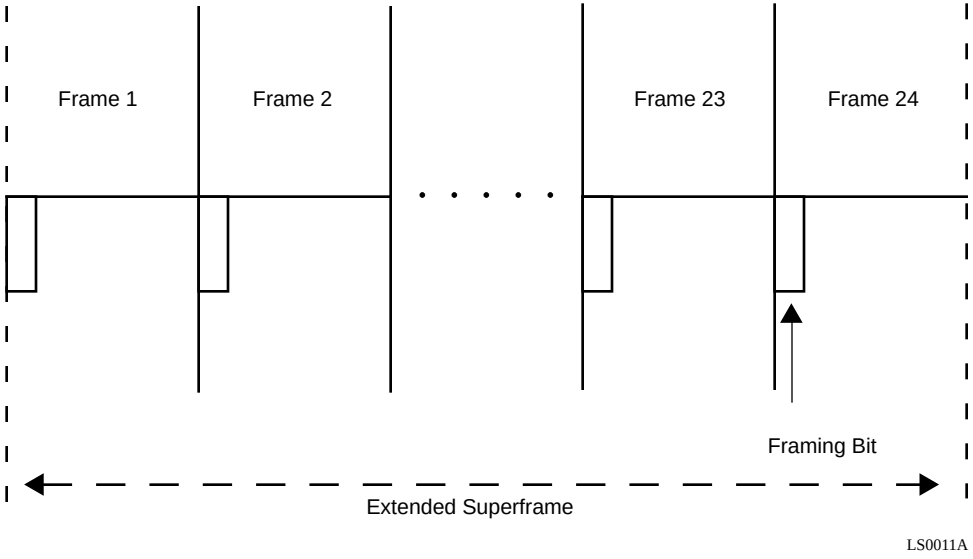

Figure 2-9. Extended Superframe

Bipolar Format

T1 and E1 use bipolar format for signals. In bipolar format, alternating positive and negative pulses on the digital line signify the number one, and the absence of a pulse signifies zero (Figure 2-10). A negative pulse must always follow a positive pulse, and vice versa.

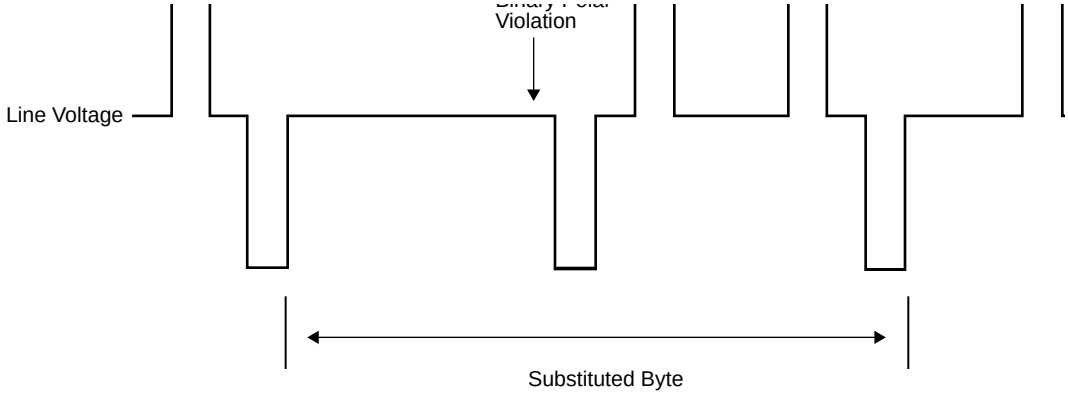

Figure 2-10. Bipolar Format

A long string of zeros on a T1 or E1 line would cause the line to lose synchronization due to lack of pulses. Bay Networks offers Bipolar with 8-Zero Substitution (B8ZS) for T1 synchronization.

B8ZS substitutes a *bipolar violation* into a string of eight consecutive zeros at the transmitting end, and removes the bipolar violation at the receiving end. In a bipolar violation, the first pulse is in the same direction (positive or negative) as the previous data pulse (Figure 2-11).

Chapter 3
Customizing LAN Interfaces

This chapter describes how to edit physical layer details for LAN interfaces, in the following sections:

- Editing CSMA/CD Lines
- Editing FDDI Lines
- Editing Token Ring Lines

Editing CSMA/CD Lines

This section describes the CSMA/CD line parameters that you can edit:

- Enabling or Disabling an Ethernet Interface
- Enabling or Disabling Breath of Life Messages
- Setting the BofL Interval
- Enabling or Disabling Hardware Filtering
- Setting the 100-Mb/s Interface Line Speed
- Configuring the CSMA/CD Automatic Negotiation Protocol

Note: For information on Ethernet LANs and the CSMA/CD protocol, see "Ethernet Overview" in Chapter 2.

Enabling or Disabling an Ethernet Interface

The router enables CSMA/CD line services when you add a 10 Mb/s or 100 Mb/s Ethernet interface. You can disable and reenable the Ethernet interface without moving physical cabling.

Site Manager: Enable parameter: page A-2

Enabling or Disabling Breath of Life Messages

With Breath of Life (BofL) enabled, the router sends polling messages from this interface to all systems on the local network. BofL messages signify that the Ethernet line is up and functioning normally.

BofL messages are enabled by default on every Ethernet interface. You can disable and reenable BofL messages on an interface.

Site Manager: BofL Enable parameter: page A-2

Setting the BofL Interval

When BofL is enabled, a network timeout will occur if five periods elapse without a successful BofL message transmission. When timeout occurs, the router automatically disables and reenables the Ethernet interface. For example, if you set the BofL interval to 10 seconds, the interface must successfully transmit a BofL message within 50 seconds.

The BofL interval is 5 seconds by default. You can change the interval of BofL messages to a value from 1 through 60 seconds.

Site Manager: BofL Timeout parameter: page A-2

Enabling or Disabling Hardware Filtering

With hardware filtering enabled, the interface drops local frames instead of copying them into system memory to be processed. Local frames contain both destination and source MAC addresses that the router has learned on the interface. Bridge software teaches the hardware filter which MAC addresses are local to an interface. Enabling hardware filtering improves bridging software performance because router resources are not used to receive and reject local frames.

Hardware filtering is disabled by default on an Ethernet interface. You can enable or disable hardware filtering.

Site Manager: Hardware Filter parameter: page A-3

Setting the 100-Mb/s Interface Line Speed

By default, the line speed for a 100 Mb/s Ethernet line is half-duplex over either twisted-pair or fiber cabling. You can set the 100-Mb/s Ethernet line speed and duplex setting to

- Automatic Line Negotiation (AUTO NEGOTIATION)
- 100Base-TX
- 100Base-FX
- 100Base FD (Full Duplex)
- 100Base FD with Congestion Control

Note that using a specific line speed configuration disables the automatic line negotiation feature.

Automatic Line Negotiation

You can configure the router to automatically negotiate with remote nodes to determine the correct line speed configuration to use on the interface.

To enable automatic line negotiation, set the Interface Line Speed parameter to AUTO NEGOTIATION; then go to the next section, "Configuring the CSMA/CD Automatic Negotiation Protocol."

Full-Duplex Congestion Control

Currently, some vendors implement 100Base-T full-duplex operation with *congestion control*, a form of flow control, while others do not. You must configure full-duplex operation with or without congestion control to be compatible with the remote equipment in your network.

Site Manager: Interface Line Speed parameter: page A-3

Configuring the CSMA/CD Automatic Negotiation Protocol

When you set the line speed to Automatic Negotiation on a 100-Mb/s Ethernet line, the Configuration Manager prompts for additional information (Figure 3-1).

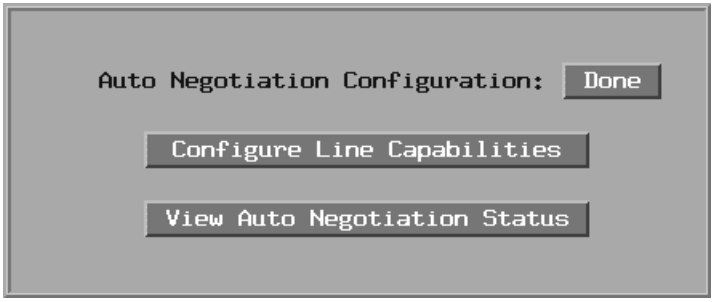

Figure 3-1. Auto Negotiation Configuration Prompt

Click on Configure Line Capabilities. The Auto Neg Advertising Capabilities window appears (Figure 3-2).

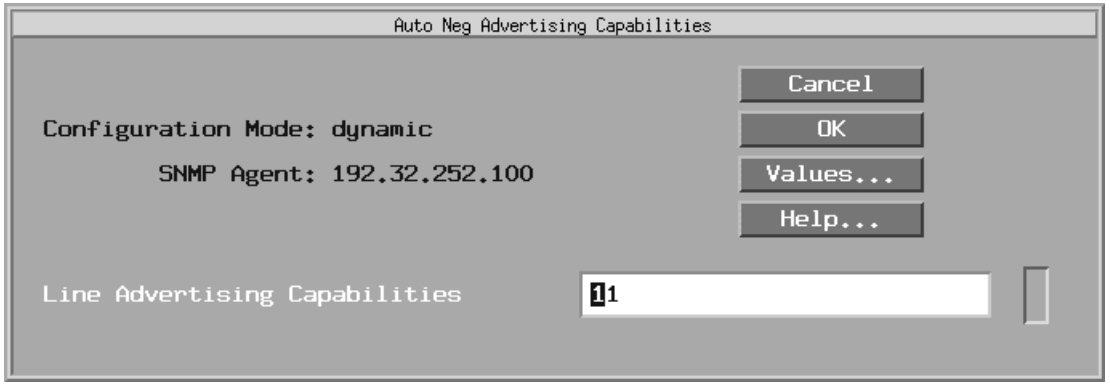

Figure 3-2. Auto Neg Advertising Capabilities Window

Selecting Line Advertising Capabilities

Site Manager negotiates with remote nodes that also have automatic line negotiation by advertising the capabilities of this 100-Mb/s interface. By default, Site Manager advertises 100Base-TX, both half- and full-duplex. Note that full-duplex support is without congestion control when negotiated automatically.

You can use Site Manager to set the advertised line speed to

- 100Base-TX, half-duplex only
- 100Base-TX, full-duplex only
- 100Base-TX, both half- and full-duplex
- No advertising

To maximize throughput, operate at half duplex (the default setting). Configuring one of the full duplex settings will not increase throughput and may, in some cases, decrease throughput.

Use the full duplex setting to allow operation at greater distances over fiber optic cable. (For example, to connect to a 28115 over a 2-km fiber link, you would use the full duplex with flow control setting and connect a copper-to-fiber adapter to the router interface RJ45 port.).

Site Manager: Line Advertising Capabilities parameter: page A-4

Viewing Line Negotiation Status

To view the current line negotiation status:

1. **Start at the Auto Negotiation Configuration prompt (refer to Figure 3-1).**
2. **Click on View Auto Negotiation Status.**

Note: Site Manager can report line negotiation status only in dynamic mode.

The Auto Negotiation State Information window appears (Figure 3-3). This window provides details about the current line configuration. Table 3-1 provides information about the status display.

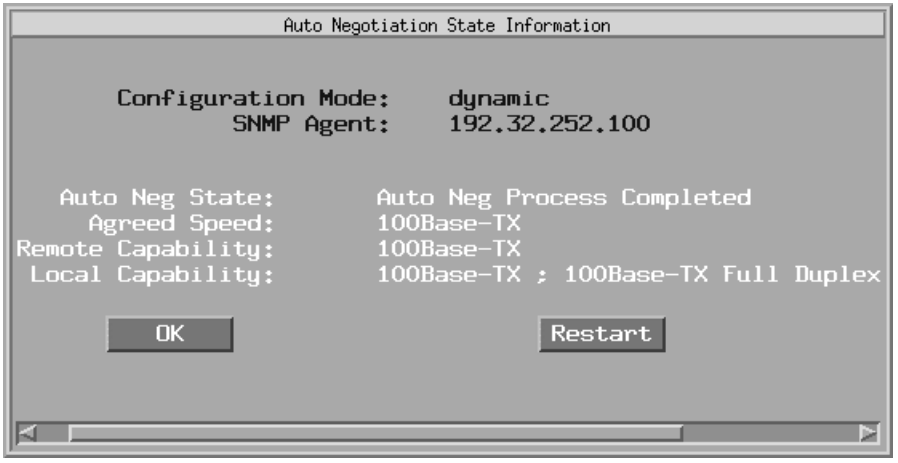

Figure 3-3. Sample Auto Negotiation State Information Window

Table 3-1. 100-Mb/s Ethernet Auto Negotiation State Information

Category	State Displayed	Description
Auto Neg State	Auto Neg Process Completed	The router and the endstation have successfully negotiated a line speed and data transmission is taking place.
	Auto Neg Process Occurring	The router and the endstation are currently negotiating a line speed.
	State Unknown	The router and the endstation cannot begin line negotiation, probably because the remote station does not have automatic line negotiation capability.
Agreed Speed	100Base-TX	The line is processing at 100 Mb/s half-duplex.
	100Base-TX Full Duplex	The line is processing at 100 Mb/s full-duplex.
Remote Capability	Any valid CSMA/CD line speed	This indicates the line speed configuration that the remote endstation is currently advertising for this line.
Local Capability	100Base-TX	This indicates the line speed or speeds that the router is currently advertising for this line (the current setting of the Line Advertising Capabilities parameter).
	100Base-TX Full Duplex	
	100Base-TX; 100Base-TX Full Duplex	

3. **Proceed as follows, depending on the status of the transaction:**

   - If negotiation or data transmission is taking place, click on OK.

     The Auto Negotiation State Information window closes, and negotiation or data transmission continues.

   - If there is a problem with the line, click on Restart.

     This action resets all automatic line negotiation parameters and restarts the line negotiation process.

Editing FDDI Lines

The following sections describe the FDDI line parameters that you can edit:

- Enabling or Disabling the FDDI Interface
- Enabling or Disabling Breath of Life Messages
- Setting the BofL Interval
- Enabling or Disabling Hardware Filtering
- Editing FDDI Station Management Attributes
- Enabling or Disabling Media Access Control LLC
- Editing FDDI Path Attributes
- Editing FDDI Port Attributes

Note: For information on FDDI, see "FDDI Overview" in Chapter 2.

Enabling or Disabling the FDDI Interface

The router enables FDDI line services when you add the interface. You can disable and reenable the interface without moving physical cables.

Site Manager: Enable parameter: page A-4

Enabling or Disabling Breath of Life Messages

With Breath of Life (BofL) enabled, the router sends polling messages from this interface to all systems on the local network. BofL messages signify that the FDDI interface is up and functioning normally.

With both this parameter and the LLC Data Enable parameter enabled, the router disables the LLC interface after the time you specify using the BofL Timeout parameter if the link becomes unavailable. When you set this parameter to Disable, the router disables the LLC interface immediately after the link becomes unavailable.

By default, BofL messages are enabled when you add the interface. You can disable and reenable BofL messages on an interface.

Site Manager: BofL Enable parameter: page A-5

Setting the BofL Interval

The BofL interval is how long the router waits before disabling the LLC interface when the link becomes unavailable and BofL is enabled.

By default, the BofL interval is 5 seconds. You can change the interval of BofL messages on an interface to a value from 1 through 60 seconds.

Site Manager: BofL Timeout parameter: page A-5

Enabling or Disabling Hardware Filtering

With hardware filtering enabled, the interface drops local frames instead of copying them into system memory to be processed by the bridge software. Local frames contain both destination and source MAC addresses that the router has learned on the interface. Bridge software teaches the hardware filter which MAC addresses are local to an interface. Enabling hardware filtering improves bridging software performance because router resources are not used to receive and reject local frames.

Hardware filtering is disabled by default on FDDI interfaces. You can enable or disable hardware filtering on an interface.

Site Manager: Hardware Filter parameter: page A-7

Editing FDDI Station Management Attributes

The SMT standard defines the protocols for managing the Physical Layer Media Dependent (PMD), the Physical Layer Protocol (PHY), and the Media Access Control (MAC) components of FDDI. The SMT protocols monitor and control the activity of each node on the ring. For more information, see “FDDI SMT” in Chapter 2.

To edit the SMT attributes for an FDDI line:

1. **Click on Expert at the Edit FDDI Parameters window.**

   The FDDI Advanced Attributes window appears (Figure 3-4).

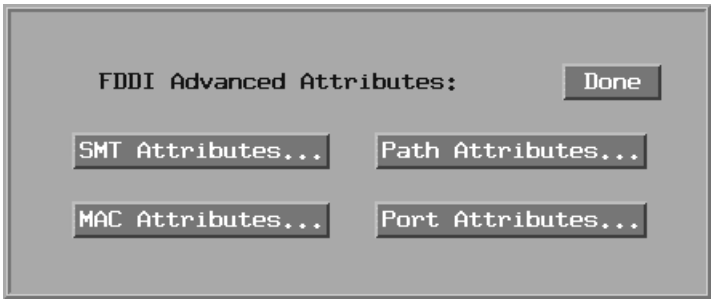

Figure 3-4. FDDI Advanced Attributes Window

Caution: Changing any of the FDDI Advanced Attributes parameters will affect the operation of your FDDI network. You should understand how to use each of these parameters to improve network performance before you modify any of them.

2. **Click on SMT Attributes.**

   The FDDI SMT Attributes window appears (Figure 3-5).

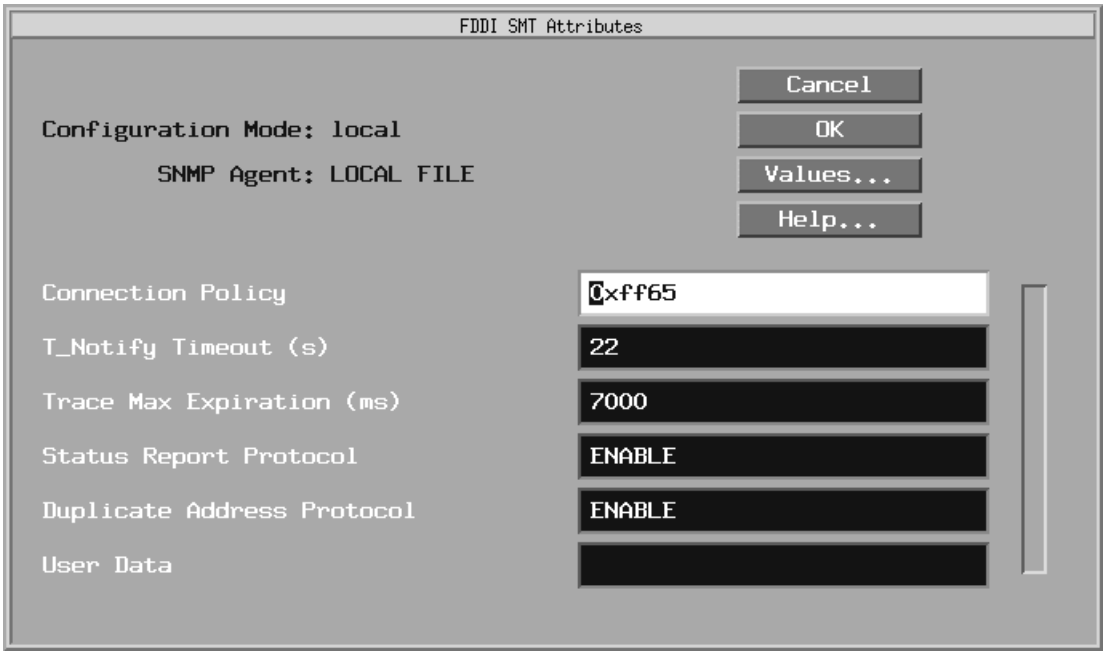

Figure 3-5. FDDI SMT Attributes Window

Specifying the SMT Connection Policy

An FDDI station sets the corresponding policy for each of the connection types that it wants to reject. The policy descriptor takes the form “rejectX-Y” where X denotes the physical connection (PC) type of the local port, and Y denotes the PC type of the neighbor port. X and Y can take the following values:

- *A* - Indicates that the port is a dual-attachment station or concentrator that attaches to the primary IN and the secondary OUT when attaching to the dual FDDI ring
- *B* - Indicates that the port is a dual-attachment station or concentrator that attaches to the secondary IN and the primary OUT when attaching to the dual FDDI ring
- *S* - Indicates a port in a single-attachment station or concentrator
- *M* - Indicates a port in a concentrator that serves as a master to a connected station or concentrator

To set the connection policies that you want this line to reject, you specify a status word to a value from 0x0 through 0xffff. Start with a value of zero for the status word (all bits set to 0).

For each connection policy that you want the node to reject, add to the status word value the number 2 raised to a power specified in Table 3-2. This is equivalent to setting a bit to 1 for each policy that you want the node to reject.

Table 3-2 lists the powers and the bits for each policy range.

Table 3-2. SMT Connection Policy Values

Policy	Power (Bit Number)	Policy	Power (Bit Number)
rejectA-A	0	rejectS-A	8
rejectA-B	1	rejectS-B	9
rejectA-S	2	rejectS-S	10
rejectA-M	3	rejectS-M	11
rejectB-A	4	rejectM-A	12
rejectB-B	5	rejectM-B	13
rejectB-S	6	rejectM-S	14
rejectB-M	7	rejectM-M	15

Figure 3-6 shows the default connection policy, status word 0xff65.

Note: You set the status word value to reflect local connection policies. Setting a particular connection policy does not necessarily mean that the station will reject the connection. The SMT standard requires that both sides of the connection must agree to reject, or else *both* sides must accept, the connection. The SMT standard requires that you set Bit 15 (rejectM-M) to 1.

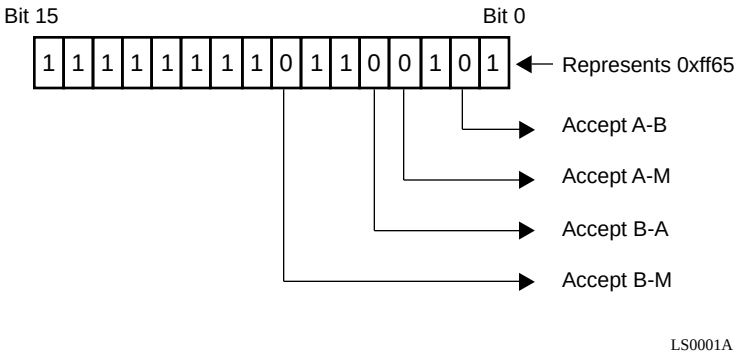

Figure 3-6. Default Connection Policy Status Word

Site Manager: Connection Policy parameter: page A-6

Specifying the Neighbor Notification Interval

You can set the interval between successful iterations of the Neighbor Notification Protocol on in interface to a value from 2 through 30 seconds. By default, the interval is 22 seconds. This interval

- Determines the MAC addresses of the FDDI upstream and downstream neighbors
- Detects duplicate MAC addresses on the ring
- Generates periodic “keepalive” traffic that verifies the local MAC transmit and receive paths

Site Manager: T_Notify Timeout parameter: page A-6

Specifying the Propagation Expiration TIme

By default, the maximum propagation time for a trace on an FDDI topology is 7 seconds. You can set the propagation expiration time to a value from 6001 through 256000 ms.

Site Manager: Trace Max Expiration (ms) parameter: page A-8

Enabling or Disabling Status Report Frames

By default, the FDDI line generates status report frames (SRFs) for its implemented events (for example, high bit errors, topology changes, trace status events, MAC frame error condition, port LER condition, and MAC duplicate address condition).

You can disable the line from or reenable the line to send status report frames. We recommend enabling SRFs to ensure that your FDDI network is ANSI-compliant.

Site Manager: Status Report Protocol parameter: page A-8

Enabling or Disabling Duplicate Addressing

By default, the router implements an optional ANSI duplicate address test involving periodic transmission of Network Service Address Network Interface Function (NSA NIF) frames to the source.

You can disable or reenable duplicate addressing on an interface.

Site Manager: Duplicate Address Protocol parameter: page A-8

Entering User Data

You can enter up to 32 alphanumeric characters of site-specific information to be attached to SIF frames.

Site Manager: User Data parameter: page A-7

Enabling or Disabling Media Access Control LLC

By default, the interface to the MAC entity is available to exchange PDUs between the MAC and the local LLC entity when the ring becomes operational. Enabling or disabling this attribute does not affect transferring and receiving MAC or SMT frame types.

You can specify whether the MAC is available to transmit and receive Logical Link Control (LLC) Protocol Data Units (PDUs) on an interface.

Site Manager: LLC Data Enable parameter: page A-9

To edit the MAC attributes for an FDDI line:

1. **Click on Expert at the Edit FDDI Parameters window.**

   The FDDI Advanced Attributes window appears (refer to Figure 3-4).

2. **Click on MAC.**

3. **Click on MAC Attributes.**

   The FDDI MAC Attributes window appears.

Caution: Changing any of the FDDI Advanced Attributes parameters will affect the operation of your FDDI network. You should understand how to use each of these parameters to improve network performance before you modify any of them.

Editing FDDI Path Attributes

You can set the target token rotation time (TTRT) carried in claim frames issued by the FDDI station, by specifying a:

- Requested TTRT
- Maximum TTRT
- Minimum Valid Transmission Time (TVX)

In Site Manager, these are known as path attributes. Figure 3-7 illustrates their relationship.

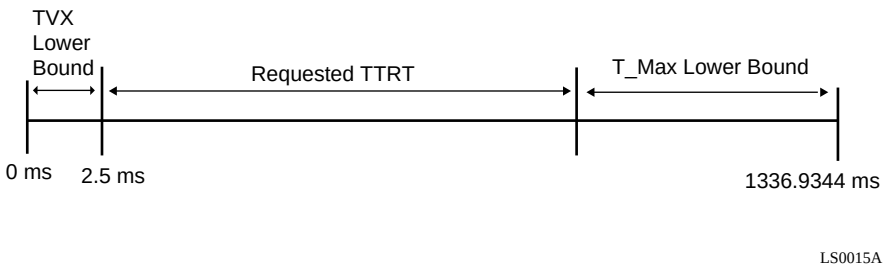

Figure 3-7. Range of Values for FDDI Path Attributes

To edit the path attributes for an FDDI line:

1. **Click on Expert at the Edit FDDI Parameters window.**

   The FDDI Advanced Attributes window appears (see Figure 3-4).

2. **Click on Path Attributes.**

   The FDDI Path Attributes window appears.

Caution: Be extremely careful when editing FDDI path parameters such as Requested TTRT. You should change the default values only if the network is part of a production or other specialized environment that requires customizing the parameters.

Specifying the Requested TTRT

The Requested TTRT value must be

- Greater than the minimum Valid Transmission Time (TVX), specified with the TVX Lower Bound parameter
- Less than or equal to the maximum TTRT (T_Max Lower Bound parameter).

Refer to Figure 3-7 for the valid range of values for Requested TTRT, in relation to the other TTRT parameters.

Site Manager: Requested TTRT (ms) parameter: page A-10

Specifying the Minimum Valid Transmission Time

The minimum TVX must be

- Greater than zero
- Less than the Requested TTRT value

By default, the minimum TVX is 2.5 ms. Refer to Figure 3-7 for the range of values for TVX Lower Bound, in relation to the other TTRT parameters.

Site Manager: Tvx Lower Bound (ms) parameter: page A-9

Specifying the Maximum TTRT

The Maximum TTRT value must be

- Greater than or equal to 10 ms
- Greater than or equal to the value of the Requested TTRT parameter
- Less than or equal to 1336.9344 ms

Refer to Figure 3-7 for the range of values for T_Max Lower Bound, in relation to the other TTRT parameters.

Site Manager: T_Max Lower Bound (ms) parameter: page A-10

Editing FDDI Port Attributes

To edit the port attributes for an FDDI line:

1. **Click on Expert at the Edit FDDI Parameters window.**

   The FDDI Advanced Attributes window appears (refer to Figure 3-4).

2. **Click on Port Attributes.**

   The FDDI Port Attributes window appears.

Specifying the LER Cutoff

The LER is an estimate at which a link connection is broken. The LER cutoff ranges from 10^{-4} to 10^{-15} and is reported as the absolute value of the base 10 logarithm. By default, the LER cutoff is 10^{-7}.

You can set the LER cutoff for an interface.

Site Manager: LER Cutoff parameter: page A-11

Specifying the Link Error Rate Alarm

The LER alarm rate is an estimate at which a link connection generates an alarm. The LER alarm ranges from 10^{-4} to 10^{-15} and is reported as the absolute value of the base 10 logarithm of the estimate. By default, the LER alarm is 10^{-8}.

Site Manager: LER Alarm parameter: page A-11

Editing Token Ring Lines

The following sections describe the Token Ring line parameters that you can edit:

- Enabling or Disabling a Token Ring Interface
- Specifying a MAC Address Override
- Specifying a MAC Address Source
- Specifying the Ring Speed
- Enabling or Disabling Early Token Release

Note: For information on Token Ring LANs, see "Token Ring Overview" in Chapter 2.

Enabling or Disabling a Token Ring Interface

By default, Site Manager enables Token Ring line services when you add the interface. You can disable and reenable the interface without moving physical cabling.

Site Manager: Enable parameter: page A-12

Specifying a MAC Address Override

You can specify a MAC address override for an interface.

Site Manager: MAC Address Override parameter: page A-12

If you want to specify a MAC address for an interface (for example, to avoid host number conflicts on a directly connected IPX or XNS network), enter the 48-bit MAC address in MSB format; that is, enter 0x followed by 12 hexadecimal digits.

If you enter a MAC address with this parameter, you must set the MAC Address Source to CNFG, as described in the next section.

If you want the router to generate the MAC address for this Token Ring interface, do not change this parameter from its default value of zero.

Specifying a MAC Address Source

By default, the Token Ring interface uses the MAC address in PROM on the link module. You can set the source for MAC addresses on a Token Ring interface to

- BOXWIDE -- the interface uses a MAC address that the software generates from the router's serial number.
- PROM -- the interface uses a MAC address from programmable read-only memory on the Token Ring link module.
- CNFG -- you explicitly assign a MAC address with the MAC Address Override parameter.

Site Manager: MAC Address Select parameter: page A-13

Specifying the Ring Speed

You can set the ring speed for a Token Ring interface to 4 or 16 Mb/s. By default, the ring speed is 16 Mb/s.

Site Manager: Speed parameter: page A-13

If you use 16 Mb/s, the router enables the Early Token Release protocol, which is used extensively on 16-Mb/s media. In the unlikely event that you want to disable Early Token Release over 16-Mb/s Token Ring media, disable Early Token Release as described in the next section.

Enabling or Disabling Early Token Release

Early token release indicates that the token can return to the ring before the recipient copies all data. By default, Site Manager enables early token release on an interface.

You can disable or reenable early token release on an interface only when the Ring Speed is16 Mb/s.

Site Manager: Early Token Release parameter: page A-13

Chapter 4
Customizing WAN Interfaces

This chapter describes customizing line parameters for ATM, E1/T1, and HSSI WAN interfaces in the following sections:

- Editing ATM ARE Lines
- Editing ATM FRE-2 Lines
- Editing E1 Lines
- Editing HSSI Lines
- Editing T1 Lines

To edit asynchronous, LAPB, and synchronous line services, see Chapter 5. To edit Multichannel E1 (MCE1) and Multichannel T1 (MCT1) lines, see Chapter 6. To edit line details for ATM DXI, follow the procedure for customizing HSSI lines later in this chapter, or synchronous lines in Chapter 5.

Editing ATM ARE Lines

The type of ATM link module that you use in your router determines how you edit the line details. For information about selecting and configuring ATM link modules, refer to *Configuring ATM Services*.

This section describes how to edit line details for these ATM ARE link modules:

- AG13110112 ARE OC-3, MM
- AG13110113 ARE OC-3, SM
- AG13110114 ARE, DS3
- AG13110115 ARE, E3

You can edit ATM ARE line parameters for

- Enabling or Disabling the ATM ARE Driver
- Setting the Maximum Transmission Unit (MTU)
- Enabling or Disabling Data Path Notify
- Setting the Data Path Notify Timeout
- Enabling or Disabling the SVC Inactivity Timeout
- Setting the SVC Inactivity Timeout
- Setting the Framing Mode
- Setting the Clock Source
- Setting the Physical Line Length (DS3 Modules Only)
- Enabling or Disabling DS3/E3 Scrambling

Enabling or Disabling the ATM ARE Driver

By default, the router enables ATM ARE line services when you add the interface to the configuration file. You can disable and reenable the interface without moving physical cabling.

Site Manager: Enable parameter: page A-19

Setting the Maximum Transmission Unit (MTU)

By default, the MTU (or, maximum packet size) on the ATM ARE interface is 4608 octets. You can change the MTU to a value from 1 through 9188 octets.

Site Manager: Interface MTU parameter: page A-19

Enabling or Disabling Data Path Notify

If the cable becomes disconnected from the ATM module, the router disables the interface between the driver and the higher-level software (the data path interface) after a period of time you specify with the Data Path Notify Timeout parameter.

You can disable and reenable Data Path Enable on the interface.

Site Manager: Data Path Enable parameter: page A-20

If you select Disable, the router does not disable the data path interface when you disconnect the cable from the ATM module. If you select Enable, be sure to set an appropriate value for the Data Path Notify Timeout parameter.

Setting the Data Path Notify Timeout

When the Data Path Enable parameter is set to Enable, the router waits a default timeout period of 1 second before disabling the interface between the driver and the higher-level software (the data path interface) after a cable becomes disconnected from the ATM module.

You can change the Data Path Notify Timeout on the interface to a value from 0 through 3600 seconds.

Site Manager: Data Path Notify Timeout parameter: page A-20

Enabling or Disabling the SVC Inactivity Timeout

You can enable or disable the SVC Inactivity Timeout Enable on the interface.

Site Manager: SVC Inactivity Timeout (Secs) parameter: page A-21

If you select Enable, the router disables any switched virtual circuit (SVC) on which the router receives or transmits no cells, for the number of seconds you specify using the SVC Inactivity Timeout (Secs) parameter.

If you select Disable, the router keeps SVCs open unless you close them by another method.

Setting the SVC Inactivity Timeout

With the SVC Inactivity Timeout enabled, the router closes the SVC if it receives or transmits no cells for a default timeout period of 1200 seconds (20 minutes).

You can set the SVC Inactivity Timeout (Secs) parameter to a value from 60 through 3600 seconds.

Site Manager: SVC Inactivity Timeout Enable parameter: page A-21

Setting the Framing Mode

You can set the transceiver mode for the physical interface (framing mode) on this interface to

- SONET or SDH, for OC-3 modules
- CBIT or M23, for DS3 modules
- G751 or G832, for E3 modules

You can use Site Manager to select the framing mode.

Site Manager: Framing Mode parameter: page A-21

By default, Site Manager sets the framing mode to SONET.

Setting the Clock Source

By default, the router uses its internal clock for time signals on this interface.

You can use Site Manager to select an external clock as the Clocking Signal Source on the interface.

Site Manager: Clocking Signal Source parameter: page A-22

Setting the Physical Line Length (DS3 Modules Only)

By default, the router conditions signals to mitigate attenuation for lines less than 225 ft. (75 m).

You can use Site Manager to set the DS3 Line Build Out for the physical length of the line on the interface.

Site Manager: DS3 Line Build Out parameter: page A-22

Select Short for lines less than 225 ft. Select Long for lines 225 ft. or greater. You can set this parameter only when using DS3 modules.

Enabling or Disabling DS3/E3 Scrambling

ATM devices with different scrambling settings cannot communicate. For example, if you configure a router to enable scrambling, and configure a hub to disable scrambling, the router and hub cannot communicate.

You can turn DS3/E3 Scrambling on or off for this interface.

Site Manager: DS3/E3 Scrambling parameter: page A-23

If you select On, the router randomizes cell payload sufficiently to guarantee cell synchronization. Be sure to enable scrambling for all devices on the network.

If you select Off, be sure to disable scrambling for all devices on the network. Be aware that cell synchronization problems may result.

Note: ATM devices with different scrambling settings cannot communicate. For example, if you configure a router to enable scrambling, and configure a hub to disable scrambling, the router and hub cannot communicate.

You can set this parameter only when using DS3 and E3 modules.

Editing ATM FRE-2 Lines

The type of ATM link module you use in your router determines how you edit the line details. For information about selecting and configuring ATM link modules, refer to *Configuring ATM Services*.

This section describes how to edit the line details for ATM FRE-2 link modules:

- 74023 ATM FRE-2 OC-3, MM
- 74024 ATM FRE-2 OC-3, SM

To edit line details for ATM DXI, follow the procedure for customizing synchronous lines in Chapter 5.

You can edit ATM FRE-2 parameters for

- Enabling or Disabling an ATM FRE-2 Circuit
- Setting the Maximum Transmission Unit (MTU)
- Enabling or Disabling Data Path Notify
- Setting the Data Path Notify Timeout
- Enabling or Disabling the SVC Inactivity Timeout
- Setting the SVC Inactivity Timeout
- Editing ATM/ALC Physical Attributes

Enabling or Disabling an ATM FRE-2 Circuit

By default, the router enables ATM FRE-2 line services when you add the interface to the configuration file.

You can disable or reenable this interface without moving the physical cabling.

Site Manager: Enable parameter: page A-23

Setting the Maximum Transmission Unit (MTU)

By default, the MTU on the ATM FRE-2 interface is 4608 octets. You can set the largest packet size that the router can transmit on this interface to a value from 1 through 9188 octets.

Site Manager: Interface MTU parameter: page A-24

Enabling or Disabling Data Path Notify

If the physical interface stops operating (for example, the cable becomes disconnected from the ATM FRE-2 module), the router disables the interface between the driver and the higher-level software (the data path interface) after a period of time you specify with the Data Path Notify Timeout parameter.

You can disable and reenable Data Path Notify for this interface.

Site Manager: Data Path Enable parameter: page A-24

If you select Disable, the router does not disable the data path interface when the physical interface stops operating.

If you select Enable, be sure to set an appropriate value for the Data Path Notify Timeout parameter.

Setting the Data Path Notify Timeout

When the Data Path Notify parameter is enabled, the router waits a default value of 3 seconds before disabling the interface. You can set the timeout period to a value from 0 to 3600 seconds on this interface.

Site Manager: Data Path Notify Timeout parameter: page A-24

Enabling or Disabling the SVC Inactivity Timeout

With the SVC Inactivity Timeout parameter enabled, the router disables any switched virtual circuit (SVC) on which it receives or transmits no cells, for the number of seconds you specify using the SVC Inactivity Timeout (Secs) parameter.

If the SVC Inactivity Timeout is disabled, the router keeps SVCs open unless you close them by another method.

You can enable or disable the **S**VC Inactivity Timeout Enable on the interface.

Site Manager: SVC Inactivity Timeout Enable parameter: page A-25

Setting the SVC Inactivity Timeout

When the SVC Inactivity Timeout is enabled, the router closes the SVC if it receives or transmits no cells for a default value of 1200 seconds (20 minutes).

You can set the SVC Inactivity Timeout on the interface to a value from 60 through 3600 seconds.

Site Manager: SVC Inactivity Timeout (Secs) parameter: page A-25

Editing ATM/ALC Physical Attributes

You need to edit ATM/ALC physical attributes only when configuring a SONET OC-3 line. Topic in this section include

- Setting the Framing Mode
- Enabling or Disabling Scrambling
- Enabling or Disabling Loopback
- Configuring Cell Insertion

Setting the Framing Mode

By default, the framing mode is SONET. You can change the framing mode to SDH, or back to SONET.

Site Manager: Framing Mode parameter: page A-25

Enabling or Disabling Scrambling

Scrambling randomizes cell payload to guarantee cell synchronization. Scrambling is enabled by default when you add the ATM ALC interface. You can disable and reenable scrambling on the interface.

Site Manager: Scrambling parameter: page A-26

Note: Disabling scrambling may cause cell synchronization problems.

Enabling or Disabling Loopback

In loopback diagnostic mode, the router retransmits received data to the sender. By default, loopback mode is disabled when you add the ATM ALC interface. You can enable and disable diagnostic loopback for the interface.

Site Manager: Loopback parameter: page A-26

Configuring Cell Insertion

In the absence of user cells, the framer device fills idle bandwidth with either idle or unassigned cells. You can configure Cell Insertion for idle or unassigned cells. By default, the router fills idle bandwidth with unassigned cells.

Site Manager: Cell Insertion parameter: page A-26

Editing E1 Lines

This section describes how to edit the line parameters for E1 link modules:

- Enabling or Disabling an E1 Line
- Enabling or Disabling CRC Checking
- Enabling or Disabling High-Density Bipolar Coding
- Setting the Clock Source
- Assigning Channel Functions

Enabling or Disabling an E1 Line

By default, the router enables E1 line services when you add the interface. You can disable or reenable this interface without moving physical cabling.

Site Manager: Enable parameter: page A-27

Enabling or Disabling CRC Checking

Some E1 equipment expects a 4-byte Cyclic Redundancy Check (CRC) trailer at the end of each frame. You can configure this interface to add the CRC trailer to received frames by enabling it as a a CRC Line Type.

Site Manager: Line Type parameter: page A-28

By default, the CRC trailer is not added to received E1 frames. Set CRC Checking to E1CRC4 if the E1 equipment expects a 4-byte CRC trailer at the end of each frame.

Enabling or Disabling High-Density Bipolar Coding

E1 uses bipolar format for signals. In bipolar format, alternating positive and negative pulses on the digital line signify the number one, and the absence of a pulse signifies zero. A negative pulse must always follow a positive pulse, and vice versa. High-Density Bipolar Coding (HDB3S) is a mechanism to maintain sufficient 1s density within the E1 data stream. Refer to the “Bipolar Format” in Chapter 2 for more information.

HDB3S support is disabled by default. You can enable or disable High-Density Bipolar Coding on this interface, depending on the ability of the associated E1 equipment to support HDB3S.

Site Manager: HDB3S Support parameter: page A-27

Setting the Clock Source

The E1 equipment associated with an E1 interface must use a compatible transmit clock. The E1 interface supports three sources for the transmit clock:

- *Internal* -- Indicates that the router sets the clock.
- *Slave* -- Indicates that the incoming data stream sets the clock
- *Manual* -- Indicates that jumpers on the E1 link module set the clock.

By default, the E1 interface uses manual clock mode, determined by hardware configuration jumpers. (Refer to *Installing and Maintaining BN Routers* or *Installing and Maintaining ASN Routers and BNX Platforms* for information on configuring the E1 module's hardware jumpers.)

You can set the Clock Mode on this interface.

Site Manager: Clock Mode parameter: page A-27

Assigning Channel Functions

Unless you change the default channel function, each E1 channel on an interface is idle by default.

You can assign these functions:

- *Data* -- Assigns the channel to data pass-through (E1 connector to E1 connector)
- *Voice* -- Assigns the channel to voice pass-through (E1 connector to E1 connector)
- *Circuit 1* -- Assigns the channel to the first E1 connector
- *Circuit 2* -- Assigns the channel to the second E1 connector
- *Idle* -- Makes the channel idle

Circuit Assignment

You cannot allocate an E1 channel to more than one E1 circuit. For example, if you allocate Channels 17 through 25 to Circuit 1 on the first E1 connector, you must make these channels idle or allocate them to Circuit 2 on the second E1 connector.

Data and Voice Pass-Through

To enable data and voice pass-through, assign identical channels to data or voice on both E1 connectors.

For example, if the first E1 connector allocates Channels 2 through 8 to voice pass-through and Channels 9 through 16 to data pass-through, the second E1 connector must also allocate Channels 2 through 8 to voice pass-through, and Channels 9 through 16 to data pass-through.

You can assign a specific function to E1 channels.

Site Manager: Mini Dacs parameter: page A-28

Editing HSSI Lines

This section describes how to edit the line parameters for HSSI link modules in the following sections:

- Enabling or Disabling a HSSI Line
- Enabling or Disabling Breath of Life Messages
- Setting the BofL Interval
- Setting the Maximum Transmission Unit Buffer Size
- Setting the Transmission Interface
- Viewing the Configured WAN Protocol
- Setting the External Clock Speed
- Setting the CRC Size

Enabling or Disabling a HSSI Line

By default, the router enables HSSI line services when you add the interface. You can enable or disable this interface without moving physical cabling.

Site Manager: Enable parameter: page A-28

Enabling or Disabling Breath of Life Messages

By default, the router transmits proprietary Ethernet-encapsulated Breath of Life (BofL) messages *over a point-to-point connection* between the local router and a remote peer. The exchange of BofL messages provides a level of confidence in the point-to-point connection.

With BofL enabled, the router sends periodic keep-alive messages to the remote peer. If you enable BofL locally, you must also configure the remote peer to enable BofL.

We recommend that you enable BofL for point-to-point connections between Bay Networks peers. However, you must disable BofL if such a connection occurs through a wide-area transport service such as Frame Relay or SMDS.

You can enable or disable transmission of BofL messages on this interface.

Site Manager: BofL parameter: page A-29

Setting the BofL Interval

This parameter is valid only if BofL is enabled on the interface.

After sending a BofL message, the router starts a timer that has a value equal to 5 times the setting of this parameter. If the router does not receive a BofL message from the remote peer before the timer expires, the router disables the HSSI circuit, and then attempts to restart it.

Both ends of the point-to-point connection must be configured with the same interval value.

You can set the BofL interval to a value from 1 through 60 seconds on this interface.

Site Manager: BofL Frequency parameter: page A-29

Setting the Maximum Transmission Unit Buffer Size

The default buffer size for the HSSI interface, or Maximum Transmission Unit (MTU), is 4608 bytes. The MTU determines the largest frame that can travel across the HSSI interface.

You can specify a MTU of 3 to 4608 bytes on this interface.

Site Manager: MTU parameter: page A-30

Viewing the Configured WAN Protocol

You can view which WAN protocol is enabled on this HSSI circuit:

- Standard
- PassThru
- PPP
- SMDS
- Frame Relay

Accept this setting; changing it does not reconfigure the interface.

Site Manager: WAN Protocol parameter: page A-30

Setting the Transmission Interface

You can select the appropriate MIB for the local management interface (LMI) to use, providing you enable LMI and configure SMDS or Frame Relay across the HSSI interface. Select one of the following MIBs, depending on the carrier services the attached DCE device provides:

- *DS1*, at 1.54 MB/s (specified by RFC 1233)
- *DS3*, at 44.736 MB/s (specified by RFC 1232)

The HSSI driver enables the DS1 MIB by default, but provides no support for either the DS1 or DS3 MIB. Rather, the external DCE (for example, a DL3200 SMDS CSU/DSU from Digital Link) may provide MIB support.

Site Manager: Transmission Interface parameter: page A-30

Setting the External Clock Speed

The HSSI specification requires that the DCE provide a transmit clock that times data transfer across the DTE/DCE interface. The External Clock Speedparameters specifies the bandwidth that the HSSI channel provides.

The External Clock Speed value does not actually affect hardware initialization. Some routing protocol software uses this parameter value for route selection.

You can set the external clock speed to a rate from 307200 through 52638515 bytes per second.

Site Manager: External Clock Speed parameter: page A-31

Select a value equal or close to the data transmission rate across the HSSI. By default, the HSSI clock rate is 46359642 (44.736 MB/s).

Setting the CRC Size

CRC size specifies an error detection scheme. You can choose either 16-bit (standard ITU-T) or 32-bit (extended) to detect errors in the packet. The remote end of the HSSI connection must be configured for the same CRC size.

You can set the CRC Size for this HSSI interface.

Site Manager: CRC Size parameter: page A-31

Editing T1 Lines

This section describes how to edit the line parameters for a T1 interface, in the following sections:

- Enabling or Disabling a T1 Line
- Setting the T1 Frame Type
- Enabling or Disabling Bipolar with 8-Zero Substitution
- Specifying the Physical Line Length
- Setting the Internal Clock Mode

Enabling or Disabling a T1 Line

The router enables T1 line services when you add the interface. You can enable or disable this interface without moving the physical cabling.

Site Manager: Enable parameter: page A-71

Setting the T1 Frame Type

T1 uses two types of frame formats:

- D4
- Extended superframe (ESF)

The frame format of the interface should match the frame format that the associated T1 equipment requires. By default, the T1 interface uses ESF framing format. For detailed information about D4 and ESF frame formats, see the “T1 Overview” section in Chapter 2.

You can set the Frame Type for this interface.

Site Manager: Frame Type parameter: page A-71

Enabling or Disabling Bipolar with 8-Zero Substitution

T1 uses bipolar format for signals. In bipolar format, alternating positive and negative pulses on the digital line signify the number one, and the absence of a pulse signifies zero.

A long string of zeros on a T1 line would cause the line to lose synchronization due to lack of pulses. Bay Networks offers Bipolar with 8-Zero Substitution (B8ZS) for T1 synchronization.

Refer to the "T1 Overview" section in Chapter 2 for detailed information.

You can enable or disable B8ZS support on this interface, depending on the ability of the associated T1 equipment to support B8ZS.

Site Manager: B8ZS Support parameter: page A-71

Specifying the Physical Line Length

Line Buildout conditions the router signals to mitigate attenuation, and depends on the physical length of the T1 line. You can configure a line length to a value from 1 through 655 ft. By default, the T1 Line Buildout is based on a physical line length of 1 foot.

You can configure the approximate length of the cable connecting the router and the associated T1 equipment for this interface.

Site Manager: Line Buildout parameter: page A-72

Setting the Internal Clock Mode

The T1 equipment associated with a T1 interface must use a compatible transmit clock. The T1 interface supports three sources for the transmit clock:

- *Internal* -- Indicates that the router sets the clock.
- *Slave* -- Indicates that the incoming data stream sets the clock
- *Manual* -- Indicates that jumpers on the T1 link or net module set the clock.

You can set the Clock Mode on this interface.

By default, the T1 interface uses manual clock mode, determined by hardware configuration jumpers. Refer to *Installing and Maintaining BN Routers* or *Installing and Maintaining ASN Routers and BNX Platforms* for information on configuring the T1 module's hardware jumpers.

Site Manager: Clock Mode parameter: page A-72

Assigning Channel Functions

Each T1 channel on an interface is idle by default. You can assign the following functions:

- *Data* -- Assigns the channel to data pass-through (T1 connector to T1 connector)
- *Voice* -- Assigns the channel to voice pass-through (T1 connector to T1 connector)
- *Circuit 1* -- Assigns the channel to the first T1 connector
- *Circuit 2* -- Assigns the channel to the second T1 connector
- *Idle* -- Makes the channel idle

Circuit Assignment

You cannot allocate an T1 channel to more than one T1 circuit. For example, if you allocate Channels 17 through 24 to Circuit 1 on the first T1 connector, you must make these channels idle or allocate them to Circuit 2 on the second T1 connector.

Data and Voice Pass-Through

To enable data and voice pass-through, assign identical channels to data or voice on both T1 connectors. For example, if the first T1 connector allocates Channels 1 through 8 to voice pass-through and Channels 9 through 16 to data pass-through, the second T1 connector must also allocate Channels 1 through 8 to voice pass-through and Channels 9 through 16 to data pass-through.

You can assign specific functions to T1 channels.

Site Manager: Mini Dacs parameter: page A-73

Chapter 5
Customizing Synchronous and Asynchronous Interfaces

This chapter describes how to edit line details for synchronous and asynchronous WAN circuits in the following sections:

- Editing Asynchronous Lines
- Editing LAPB Protocol Attributes
- Editing Synchronous Lines

Editing Asynchronous Lines

This section describes the line service parameters that you can edit for a leased-line asynchronous interface. See *Configuring Dial Services* for information about customizing asynchronous dial-up lines.

- Enabling or Disabling the Asynchronous Driver
- Setting the Maximum Transmission Unit (MTU)
- Specifying the Start Protocol
- Setting the Remote IP Address
- Specifying the Remote Port
- Specifying the Local Port
- Setting the Baud Rate
- Setting the Idle Timer
- Setting the TCP Receive Window Size
- Setting the TCP Keepalive Message Interval
- Setting the TCP Inactive Limit
- Setting the Maximum Transmit Queue Length
- Setting the Maximum Receive Queue Length

Note: On a Bay Networks AN or ASN router, or with a configured Octal Sync link module, the Configuration Manager displays the Edit ASYNC Parameters window when you select the asynchronous protocol from the WAN Protocols window for a COM port line. Use the window's scroll bar to view all of the asynchronous line parameters.

Enabling or Disabling the Asynchronous Driver

The router enables asynchronous line services when you add the interface. You can disable and reenable the interface without moving any physical cabling.

Site Manager: Enable parameter: page A-14

Setting the Maximum Transmission Unit (MTU)

By default, the the router can transmit packets up to 1000 bytes on an asynchronous interface via the Transmission Control Protocol (TCP). This value is the MTU. You can set the MTU to a value from 3 through 1580 bytes on this interface.

Site Manager: MTU parameter: page A-15

Specifying the Start Protocol

There are three options for the start protocol for an asynchronous TCP connection:

- *Answer* -- Advises local TCP to wait for a connection request
- *Loop* -- Performs asynchronous cable testing
- *Originate* -- Advises local TCP to initialize a connection to the specified remote IP address, specified in the Remote IP Address parameter

You can select the start protocol for this interface.

Site Manager: Start Protocol parameter: page A-15

With the Start Protocol set to Originate, you must configure the

- Remote IP Address
- Remote Port
- Local Port

Setting the Remote IP Address

The router uses the remote IP address only when the asynchronous Start Protocol parameter is set to Originate.

The Remote IP Address specifies a remote TCP host to which this router will communicate using the asynchronous interface. You can specify any valid 32-bit IP address in dotted decimal notation as the Remote IP Address for this interface.

Site Manager: Remote IP Addr parameter: page A-15

Specifying the Remote Port

The router uses the remote port number only when the Start Protocol parameter is set to Originate. The Remote Port number specifies a remote port for the TCP connection.

By default, the remote port is set to 7. You can specify any valid remote port number from 1 through 65535 for this interface.

Site Manager: Remote Port parameter: page A-16

Specifying the Local Port

The router uses the local port number only when the Start Protocol parameter is set to Originate. The Local Port number specifies a local port for the TCP connection for asynchronous communications.

By default, the remote port is set to 2100. You can specify any valid local port number from 1 through 65535 for this interface.

Site Manager: Local Port parameter: page A-16

Setting the Baud Rate

The Baud Rate parameter specifies the line speed for this asynchronous interface. Select one of the following valid baud rates:

- 300
- 1200
- 2400
- 4800
- 9600
- 19200

By default, the baud rate is 9600 on an asynchronous interface.

You can specify the baud rate for this interface.

Site Manager: Baud Rate parameter: page A-16

Setting the Idle Timer

By default, the router sets the idle timer to 20 seconds for an asynchronous interface.

You can set the idle timer from 1 through 300 seconds for this asynchronous interface.

Site Manager: Idle Timer parameter: page A-17

Setting the TCP Receive Window Size

By default, the router sets the TCP receive window for received asynchronous packets to 4096 bytes.

You can set the receive window to a value from 512 through 65535 bytes for this interface.

Site Manager: Receive Window parameter: page A-17

Setting the TCP Keepalive Message Interval

The TCP Keepalive message interval specifies how often the local TCP sends keepalive messages to the remote TCP. The interval is 8 seconds by default.

When the local TCP sends out a TCP keepalive message on the asynchronous interface, it expects an acknowledgment (ACK) from the remote TCP. The ACK then resets the inactive limit timer.

If the local TCP does not receive the ACK from the remote TCP within the time limit specified by the TCP Inactive Limit parameter, the TCP connection is disabled. To prevent an error or alarm condition, set the TCP Inactive Limit parameter to a value that allows enough time for multiple TCP keepalive messages.

You can set the TCP KeepAlive parameter to a value from 3 through 180 seconds for this interface.

Site Manager: TCP KeepAlive parameter: page A-17

The router uses this parameter with the TCP Inactive Limit parameter.

Setting the TCP Inactive Limit

When the TCP Inactive Limit timer expires, the TCP connection between the router and the remote TCP host is lost. By default, the TCP connection on an asynchronous interface times out in 300 seconds.

To prevent a TCP connection loss, set this parameter to a value that allows enough time for multiple TCP keepalive messages and ACKs from the remote TCP host.

If the interface is listening for an incoming connection, you can specify a negative value for this parameter to mark the connection as inactive and defer resetting the connection until a connection request is received.

You can set the TCP Inactive Limit to a value from -65536 through 65535 seconds for this interface.

Site Manager: TCP Inactive Limit parameter: page A-18

Setting the Maximum Transmit Queue Length

The Cfg TxQ Length parameter specifies the maximum length of the transmit queue for the asynchronous interface.

If the driver transmit queue is larger than the value of this parameter, the size of the driver transmit queue is reduced to the value of this parameter.

You can set the maximum transmit queue length for this interface to a value from 1 through 255 bytes.

Site Manager: Cfg TxQ Length parameter: page A-18

Setting the Maximum Receive Queue Length

The Cfg RxQ Length parameter specifies the maximum receive queue length for an asynchronous interface.

If the driver receive queue is larger than the value of this parameter, this parameter reduces the size of the driver receive queue.

You can set the maximum receive queue to a value from 1 through 255 bytes for this interface.

Site Manager: Cfg RxQ Length parameter: page A-19

Editing LAPB Protocol Attributes

This section describes the LAPB line parameters that you can edit when you configure X.25 on a Bay Networks AN or ASN router, or on an Octal Sync link module line. Topics include

- Enabling or Disabling LAPB Services
- Setting the Control Field
- Setting the Station Type
- Setting the Maximum N1 Frame Size
- Setting the Window Size
- Setting the N2 Retry Count
- Setting the T1 Acknowledge Timer
- Setting the Sequenced Frame T2 Acknowledge Timer
- Setting the T3 Disconnect Timer
- Setting the Link Setup Action
- Enabling or Disabling Test Exchange Identification (XID) Frames
- Enabling or Disabling Receiver Ready (RR) Frames
- Selecting the Local Command or Response Address
- Viewing the WAN Protocol

Enabling or Disabling LAPB Services

The router enables LAPB line services when you configure a synchronous circuit for the X.25 protocol. You can disable and reenable LAPB services on the interface without moving any physical cabling.

Site Manager: Enable parameter: page A-32

Setting the Station Type

The Station Type parameter identifies whether the device is a DTE or DCE, for this interface.

If your device is data terminal equipment, select DTE. If your device is data communications equipment, select DCE.

If you do not want to assign a specific station type, and instead want the network to determine the station type, choose DXE. This value indicates that the router is in unassigned mode; it is neither a DTE nor a DCE. If you select DXE, the router will send an exchange identification (XID), but negotiation will not take place until the network assigns a station type.

By default, the station type is DTE. You can set the station type of the interface.

Site Manager: Station Type parameter: page A-32

Setting the Control Field

The Control Field parameter specifies the desired window size, or modulo, of the sequence numbering the router uses to number frames:

- Modulo 8
- Modulo 128

By default, the control field is set to Modulo 8. You can set the control field on the interface.

Site Manager: Control Field parameter: page A-33

Setting the Maximum N1 Frame Size

The Max N1 Frame Size parameter specifies the frame size, in bytes, for a frame that the router or network transmits. This number excludes flags and 0 bits inserted for transparency.

By default, the Max N1 Frame Size is set to 1600 bytes.

You can select a frame size from 3 through 4500 bytes to suit your network configuration.

Site Manager: Max N1 Frame Size (octets) parameter: page A-33

Setting the Window Size

The Window Size parameter specifies the default transmit and receive window size for the interface. This value is the maximum number of unacknowledged sequence frames that may be outstanding from the router or the network at any one time.

By default, the window size is 7 frames. You can select a window size from 1 through 127 frames to suit your network configuration.

Site Manager: Window Size parameter: page A-33

Setting the N2 Retry Count

The Max N2 Retries parameter determines the value of the N2 retry count, which is the number of retransmission attempts that the router makes, per frame, before it considers the line to be down. The retry count is the maximum number of attempts following the expiration of the T1 timer.

By default, the number of times the router tries to retransmit is set to 10. You can set the number of retries from 1 through 64 on this interface.

Site Manager: Max N2 Retries parameter: page A-34

Setting the T1 Acknowledge Timer

The Max T1 Acknowledge Timer specifies the maximum time, in seconds, that the router waits for an acknowledgment of a frame that it has sent to the network.

By default, this timer is set to 3 seconds. You can set the maximum time that the router should wait for a frame acknowledgment from the network to a value from 1 through 9999 seconds.

Site Manager: Max T1 Acknowledge Timer (seconds) parameter: page A-34

Setting the Sequenced Frame T2 Acknowledge Timer

The Max T2 Acknowledge Timer specifies the time, in seconds, that the router waits before sending an acknowledgment for a sequenced frame.

The default value of 1 means that the router does not delay before generating an acknowledgment.

You can set the amount of time that you want the router to wait before acknowledging a sequenced frame to a value from 1 through 9999 seconds.

Site Manager: Max T2 Acknowledge Timer (seconds) parameter: page A-35

Setting the T3 Disconnect Timer

The Max T3 Disconnect Timer specifies the time, in seconds, that the router waits before determining that the link is disconnected.

By default, this timer is set to 60 seconds. A value of 1 indicates that once the router completes the frame exchange to bring down the link, it considers the link disconnected.

You can set the amount of time that you want the router to wait before it decides that the link is disconnected to a value from 1 through 9999 seconds.

Site Manager: Max T3 Disconnect Timer (seconds) parameter: page A-35

Setting the Link Setup Action

The Link Setup Action parameter identifies whether or not the router initiates link setup or waits for the network to initiate.

Enter Active if you want the router to initiate link setup, or Passive if you want the network to initiate link setup. Link Setup is Active by default.

You can set the Link Setup Action to Active or Passive.

Site Manager: Initiate Link Setup Action parameter: page A-36

Enabling or Disabling Test Exchange Identification (XID) Frames

The Enable Rx/Tx of XID Frames parameter enables or disables the transmission and reception of test exchange identification (XID) frames by the router.

Select Enable to allow the router to send XID frames. Select Disable to prevent the router from sending XID frames.

You can enable or disable transmission of XID frames on this interface.

Site Manager: Enable Rx/Tx of XID Frames parameter: page A-36

Enabling or Disabling Receiver Ready (RR) Frames

The Idle RR Frames parameter enables or disables the transmission and reception of Receiver Ready (RR) frames during periods when there are no information frame exchanges.

By default, the router does not transmit RR frames on the LAPB interface. When this parameter is set to On, an RR is transmitted when no traffic is present on the physical media.

You can enable or disable transmission of RR frames on this interface.

Site Manager: Idle RR Frames parameter: page A-37

Selecting the Local Command or Response Address

The Command/Response Address parameter specifies the local command or response address, which is the DTE or DCE value.

Select DTE for the DTE address, or DCE for the DCE address. The address is set to DTE by default.

You can set the local address on this interface.

Site Manager: Command/Response Address parameter: page A-36

Viewing the WAN Protocol

You can view whether the Standard (Wellfleet PPP) or X.25 protocol is enabled on this interface. Do not change the current value.

Caution: Changing the WAN protocol does not reconfigure the interface, and could disable it.

Site Manager: WAN Protocol parameter: page A-37

Editing Synchronous Lines

This section describes how to edit synchronous line service parameters. Topics include

- Enabling or Disabling a Synchronous Circuit
- Enabling or Disabling Breath of Life Messages
- Setting the BofL Timeout
- Setting the Maximum Transmission Unit (MTU)
- Enabling or Disabling Remote Address Filtering
- Setting the Clock Source
- Setting the Internal Clock Speed
- Setting the External Clock Speed
- Setting the Signal Mode
- Enabling or Disabling RTS Signals
- Enabling or Disabling DMA Burst Cycles
- Specifying the Link Level Protocol
- Setting the Transmit Window Size
- Setting Minimum Frame Spacing
- Specifying Local and Remote Point-to-Point Addresses
- Viewing the Configured WAN Protocol
- Setting Pass-Through Addresses
- Setting the CRC Size
- Setting the Signaling Method

- Enabling or Disabling Sync Polling
- Setting the Line Coding
- Specifying the Network Link Level
- Setting the Retry Count
- Setting the Link Idle Timer
- Enabling or Disabling Extended Control
- Enabling or Disabling Receiver Ready Signals
- Setting the Cable Type
- Setting the Retry Timer
- Enabling or Disabling Extended Addressing
- Enabling or Disabling Remote Loopback Detection
- Setting the Sync Hold Down Time
- Setting Sync Priority
- Setting the B Channel Override
- Configuring KG84A Security

Enabling or Disabling a Synchronous Circuit

The router enables synchronous line services when you add the interface. You can disable and reenable the interface without moving physical cabling.

Site Manager: Enable parameter: page A-55

Enabling or Disabling Breath of Life Messages

The BofL parameter enables or disables the transmission of proprietary Breath of Life messages *over a point-to-point connection* between the local router and a remote peer.

The exchange of BofL messages provides a level of confidence in the point-to-point connection.

With BofL enabled, the router sends periodic keepalive messages to the remote peer. If you enable BofL locally, the remote peer must also be configured to enable BofL.

We recommend that you enable BofL for point-to-point connections between Bay Networks peers. However, if such a connection is accomplished through a wide-area transport service such as Frame Relay, X.25, or SMDS, you must disable BofL.

You can disable and reenable BofL messages on the interface.

Site Manager: BofL parameter: page A-55

Setting the BofL Timeout

The BofL Timeout parameter specifies the time between transmissions of Breath of Life messages from this synchronous interface.

This parameter is valid only if you set BofL to Enable. By default, the BofL timeout is set to 5 seconds.

Timeout will occur if five periods elapse without both a successful frame transmission and a successful reception. When timeout occurs, the router disables and reenables the synchronous line. For example, with this parameter set to 5 seconds, the interface must successfully transmit and receive a frame within 25 seconds. Timeout occurs in 25 seconds.

You can set the BofL timeout to a value from 1 through 60 seconds on the interface.

Site Manager: BofL Timeout parameter: page A-56

Setting the Maximum Transmission Unit (MTU)

The MTU parameter specifies the largest frame that the router can transmit on this line. The MTU is 1600 bytes by default.

You can set the MTU from 3 through 4608 bytes on the interface.

Site Manager: MTU parameter: page A-56

For X.25, use a value at least 5 bytes more than the maximum packet size for the packet level.

Enabling or Disabling Remote Address Filtering

Set the Promiscuous parameter to specify whether the interface filters out packets for addresses other than its own local address, or whether addressing filtering is based on the both the local and remote address. With this parameter set to Enable, (address filtering is based on both local and remote address), all frames are received on the interface.

By default, the parameter is disabled; address filtering is based on the local address and the interface receives only frames destined for its local address.

You can enable or disable local and remote (promiscuous) address filtering on the interface.

Site Manager: Promiscuous parameter: page A-57

Setting the Clock Source

The Clock Source parameter specifies whether the origin of the synchronous timing signals are supplied by the router (Internal) or supplied by a network device (External).

With this parameter to Internal, this router supplies the required timing signals. If you set the clock to Internal, set the internal clock speed as described in the next section.

With this parameter set to External (the default), an external network device supplies the required timing signals. In most cases, this parameter should be set to External. See the “Setting the External Clock Speed” section.

You can set the clock source for the interface.

Site Manager: Clock Source parameter: page A-57

Setting the Internal Clock Speed

The Internal Clock Speed parameter sets the clock speed of an internally supplied clock when the Clock Source parameter is set to Internal. You cannot set this parameter when the Clock Source parameter is set to External.

By default, the internal clock speed is 64 Kb/s. Set the clock speed for the internal clock to the desired data transmission rate across the synchronous line.

You can set the internal clock to

- 1200, 2400, 4800, 7200, 9600, 19200, 32000, or 38400 B
- 56, 64, 125, 230, 420, 625, or 833 Kb
- 1.25, 2.5, or 5 Mb

Some routing protocol software uses this parameter value for route selection. If you configure protocol prioritization, the router uses this parameter to calculate line delay. See *Configuring Traffic Filters and Protocol Prioritization* for information about protocol prioritization, latency, and queue depth.

You can set the internal clock speed for the interface.

Site Manager: Internal Clock Speed parameter: page A-58

Setting the External Clock Speed

The External Clock Speed parameter sets the clock speed of an externally supplied clock when the Clock Source parameter is set to External. You cannot set this parameter when the Clock Source parameter is set to Internal.

By default, the external clock speed is 64102 bits/s. Set the clock speed for the external clock to the data transmission rate that most closely corresponds to the speed of the external clock. You can set the external clock to a value from 1200 through 6000000 bits/s.

Some routing protocol software uses this parameter value for route selection. If you configure protocol prioritization, the router uses this parameter to calculate line delay. See *Configuring Traffic Filters and Protocol Prioritization* for information about protocol prioritization, latency, and queue depth.

You can set the external clock speed for the interface.

Site Manager: External Clock Speed parameter: page A-69

Setting the Signal Mode

You use the Signal Mode parameter to set either Balanced or Unbalanced transmission on an interface, depending on the signaling mode of the connected device.

Balanced transmission uses two conductors to carry signals; *unbalanced transmission* uses one conductor to carry a signal, with a ground providing the return path.

You can set Balanced or Unbalanced transmission for the interface.

Site Manager: Signal Mode parameter: page A-58

Enabling or Disabling RTS Signals

The RTS Enable parameter enables or disables the detection of request to send (RTS) signals on this interface.

Set this parameter to Enable if the connected device (for example, a modem or a KG84A cryptographic device) uses RTS/CTS flow control.

You can enable or disable RTS signals for the interface.

Site Manager: RTS Enable parameter: page A-59

Enabling or Disabling DMA Burst Cycles

The Burst Count parameter specifies single or multiple DMA burst cycles.With this parameter set to Enable, the chip performs eight-word bursts. With the parameter set to Disable, the chip performs single-word burst cycles.

This is a performance-tuning parameter. Set it to Enable except when configuring an interface on these link modules:

- DSDE (5430 - Dual Synchronous, Dual Ethernet)
- DSE (5420 - Dual Synchronous, Single Ethernet)

Set it to Disable if excessive TxUflo or RxOflo errors occur on the Ethernet ports.

If you have configured both synchronous ports, disable this parameter first on the synchronous interface that is either running at a lower clock speed or carries lower-priority traffic. You should disable this parameter on both synchronous interfaces only if those interfaces are DSDE configurations and you configured both Ethernet interfaces. In these configurations, disable this parameter on both synchronous interfaces if disabling it on only one interface does not eliminate the excessive TxUflo or RxOflo errors on the two Ethernet interfaces.

You can enable or disable DMA Burst cycles for the interface.

Site Manager: Burst Count parameter: page A-59

Specifying the Link Level Protocol

The Service parameter specifies the link-level protocol for this interface. You can set the link-level protocol to

- Transparent
- LLC1
- LAPB

The synchronous interface is configured for LLC1 by default.

If you set this parameter to Transparent, then raw HDLC mode is in effect. LLC1 specifies connectionless datagram service; it prefixes the HDLC address and control fields to the frame.

If X.25 is enabled on this line, this parameter must be set to LAPB.

You can set the link-level protocol for the interface.

Site Manager: Service parameter: page A-60

Setting the Transmit Window Size

The Transmit Window Size parameter controls the number of I-frames that can be transmitted without acknowledgment.

The default is 1 frame. You can set the Transmit Window size to a value from 1 through 7 I-frames.

Site Manager: Transmit Window Size parameter: page A-62

Setting Minimum Frame Spacing

Minimum Frame Spacing specifies the minimum number of flags transmitted between adjacent frames on this interface.

The interface transmits 1 frame by default. You can set frame spacking to a value from 1 through 32 flags for the interface.

Site Manager: Minimum Frame Spacing parameter: page A-62

Specifying Local and Remote Point-to-Point Addresses

According to convention, one end of a point-to-point circuit is designated DCE and is assigned an address of 01; the other end of the circuit is designated DTE and is assigned an address of 03.

If you configure a device at one end with a local address of 1 (DCE) and remote address of 3 (DTE), you must configure the device at the other end with a local address of 3 (DTE) and remote address of 1 (DCE). The remote and local addresses must be 1 (DCE) or 3 (DTE) if you configure X.25 on a line.

Conventional addressing, however, is inadequate in the case of multiple communication channels enabled by a common satellite link. As illustrated in Figure 5-1, a common satellite relay link provides a virtual point-to-point link between routers A and X, B and Y, and C and Z.

Conventional addressing designates routers A, B, and C as DCE (address = 01) and routers X, Y, and Z as DTE (address = 03). If router A transmits a frame across the virtual point-to-point circuit to X, X (the intended recipient), Y, and Z all monitor the satellite broadcast. Because X, Y, and Z all perceive a properly addressed frame, all three accept delivery and attempt to process the frame contents, with unpredictable results.

To avoid such confusion, assign unique addresses to each end of a point-to-point circuit using the Local Address and Remote Address parameters. Be sure to reverse the local and remote addresses when you configure the other end of the point-to-point circuit.

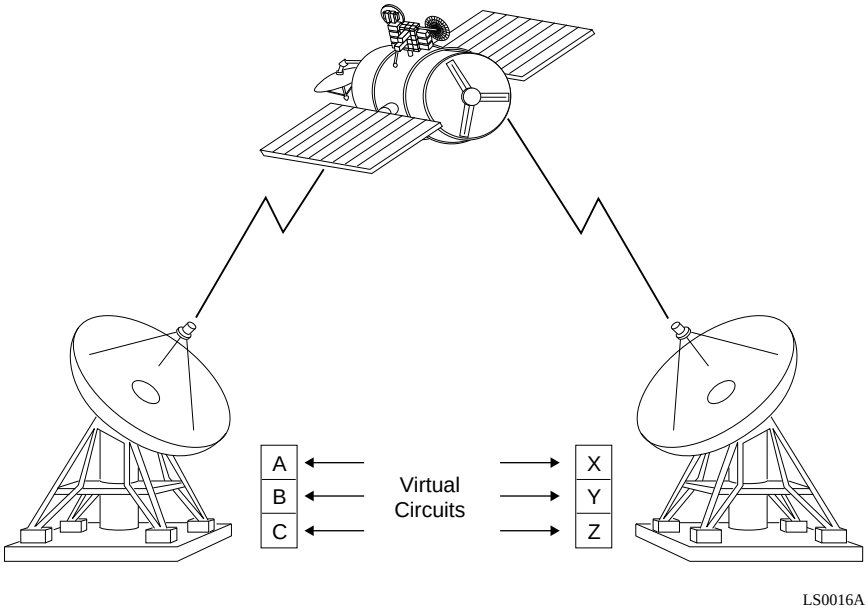

Figure 5-1. Satellite Broadcast (Sample Topology)

You can set the Local Address for the interface.

Site Manager: Local Address parameter: page A-62

You can set the Remote Address for the interface.

Site Manager: Remote Address parameter: page A-63

Viewing the Configured WAN Protocol

You can view which WAN protocol is enabled on this synchronous circuit. Do not change the current value.

Caution: Changing the WAN protocol does not reconfigure the interface, and could disable it.

Site Manager: WAN Protocol parameter: page A-64

Setting Pass-Through Addresses

You can assign a local MAC address to the local interface using the Pass Thru Local Address parameter. This address becomes the source address of packets that are bridged to the destination MAC address.

You assign the destination MAC address with the Pass Thru Remote Address parameter. This address becomes the destination MAC address of packets that are bridged to the local MAC address.

Always reverse the local and remote MAC addresses at the remote synchronous pass-through interface.

When assiging addresses, use any unique MAC address of exactly 12 hexadecimal digits; be sure that the second digit in the address is a zero, for example, 10fffabc5432.

You can set a Pass Thru Local Address for the interface.

Site Manager: Pass Thru Local Address parameter: page A-63

You can set a Pass Thru Remote Address for the interface.

Site Manager: Pass Thru Remote Address parameter: page A-64

Setting the CRC Size

The Cyclic Redundancy Check (CRC) size specifies an error detection scheme. You can choose either 16-bit (standard ITU-T) or 32-bit (extended) frame check sequence (FCS) to detect errors in the packet. The remote end of the sychronous connection must be configured for the same CRC size.

You can set a CRC size for the interface.

Site Manager: CRC Size parameter: page A-64

Setting the Signaling Method

You can specifythe signaling method that the router uses for this line with the Sync Media Type parameter. Available media types are

- Default
- T1
- E1
- RAISEDTR
- V25BIS
- ISDN
- ISDNLEASEDLINE

You can set the media type used for the interface.

Site Manager: Sync Media Type parameter: page A-65

Enabling or Disabling Sync Polling

By default, a synchronous interface does not monitor the Data Set Ready (DSR) signal. If you set this parameter to Enable, the synchronous driver is enabled when the DSR is detected. When the DSR is no longer detected, the driver will be disabled. Enable this parameter only if you will be using dial-up services.

You can enable or disable Sync Polling for the interface.

Site Manager: Sync Polling parameter: page A-67

Setting the Line Coding

On AN or ASN routers, and on a router with an Octal Sync link module, you can specify the line coding of the physical synchronous line to match the line coding of a device at the other end of the line. Specify the line coding as follows:

- Select *NRZ* for Non-Return to Zero coding.
- Select *NRZI* for Non-Return to Zero Inverted coding.
- Select *NRZI Mark* for Non-Return to Zero Inverted Mark coding.

Line coding is NRZ by default.

Note: See "Configuring KG84A Security" for information about the KG84A parameters.

You can set the line coding for the interface.

Site Manager: Sync Line Coding parameter: page A-69

Specifying the Network Link Level

By default, the Network Link Level for this synchronous point-to-point connection is NET2.

Change this parameter to GOSIP when this synchronous point-to-point connection is part of a GOSIP-compliant network (such as DOD).

Change this parameter to SYNC_TYPE_C03 when you are running X.25 on a synchronous board with the MK-5025 C03 chip.

You can set the link level for the interface.

Site Manager: Network Link Level parameter: page A-68

Setting the Retry Count

By default, the router makes 16 attempts to retransmit a frame before a line is declared down. You can specify the number of retransmission attempts, from 1 through 64, for the interface.

Site Manager: Retry Count parameter: page A-60

Setting the Link Idle Timer

By default, the router determines that a synchronous interface is idle after 9 seconds. An idle line is disabled. You can specify the length of the timer, to a value through 1 and 9999 seconds, before a line is determined to be idle with the Link Idle Timer parameter.

Site Manager: Link Idle Timer parameter: page A-60

Enabling or Disabling Extended Control

By default, the control fields of all S- and I- frames are one octet in length and I-frame numbering is Modulo 8. With the Extended Control (S- and I- frames) parameter, you can extend the control fields of S- and I- frames to two octets in length, and numbering of all I frames to Modulo 128.

You can enable or disable extended control of S- and I- frames for the interface.

Site Manager: Extended Control (S and I frames) parameter: page A-61

Enabling or Disabling Receiver Ready Signals

By default, the synchronous interface does not send a Receiver Ready (RR) signal when the Link Idle Timer expires. Enable the Idle RR Frames parameter if you want the router to send RRs.

You can enable or disable idle RR signals for the interface.

Site Manager: Idle RR Frames parameter: page A-65

Setting the Cable Type

If the synchronous interface is connected to a dial-up device for switched services, you can specify the cable interface type of the device that connects the dial unit. You can select one of the following cable types:

- Null
- RS232
- RS422
- V35
- X21

By default, the Cable Type parameter is set to Null. You can set the cable type for the interface.

Site Manager: Cable Type parameter: page A-68

Setting the Retry Timer

By default, the router waits 3 seconds for a response from the interface. When the timer expires, the router

1. Sends Link Control frames.
2. Resends the frames up to the value of the Retry Count parameter.
3. Disconnects the link.

You can specify the length of time, to a value from 1 through 9999 seconds, before the retry process begins by setting the value of the Retry Timer on the interface.

Site Manager: Retry Timer parameter: page A-61

Enabling or Disabling Extended Addressing

By default, the router does not test the address length of frames on a synchronous interface. With the Extended Address parameter enabled, the router tests the first bit of the address to determine the length of the address, in octets.

You can enable or disable extended addressing for the interface.

Site Manager: Extended Address parameter: page A-61

Enabling or Disabling Remote Loopback Detection

You can configure the router to automatically disable a synchronous interface upon detecting its own BofL messages by enabling the Remote Loopback Detection on an interface. If BofL is enabled, the device driver disables the interface upon receiving its own BofL packets, assuming that the link has been put into loopback mode. This function is disabled by default.

You can enable or disable remote loopback detection for the interface.

Site Manager: Remote Loopback Detection parameter: page A-69

Setting the Sync Hold Down Time

On a synchronous interface configured for dial services, you can specify a time period (0 to 9999 seconds) for the router to wait before bringing up the line. This delay allows time for the primary line to recover before activating a dial-up line.

The Sync Hold Down Time parameter is set to 0 by default. You can set the hold down time for the interface.

Site Manager: Sync Hold Down Time parameter: page A-68

Setting Sync Priority

On a synchronous interface configured for dial or switched services, you can assign a priority number (from 1 through 50) to each line within the same demand or backup pool.

The lower the number, the higher the Sync Priority. For example, the router uses a line of priority 1 before it uses a line of priority 2.

You can set the priority for the interface.

Site Manager: Sync Priority parameter: page A-70

Setting the B Channel Override

On AN and ANH routers with ISDN support only, you can connect the ISDN B Channel to a specific serial communications controller (SCC). By default, the B Channel is determined by the connector.

You can use the Sync B Channel Override parameter to specify which B Channel this interface is using for ISDN. Select BCHANNEL1 or BCHANNEL2 to explicitly assign the B Channel. You can set the B channel to

- DEFAULT
- BCHANNEL1
- BCHANNEL2
- FLOATINGB

  If your ISDN service provider only offers 2B + D service, the FLOATINGB option enables you to use only one B channel for dial service applications. Floating B is an alternative if you cannot purchase 1B + D service.

  Select FLOATINGB to use only one B Channel of ISDN, which becomes BCHANNEL1 or BCHANNEL2 depending on the call setup procedures. COM1 and COM2 become available in this mode.

You can configure the B Channel on an AN or ANH ISDN interface.

Site Manager: Sync B Channel Override parameter: page A-70

Configuring KG84A Security

KG84A is a cryptographic device used to secure data transmitted over a point-to-point synchronous line.

Bay Networks KG84A support allows the router to use the encryption services of a KG84A device. In a KG84A configuration, the KG84A device is usually placed between the router and a modem. The KG84A device acts as the DCE for the attached router. Another KG84A device must be located at the other end of the point-to-point connection so that encrypted data can be decrypted (Figure 5-2).

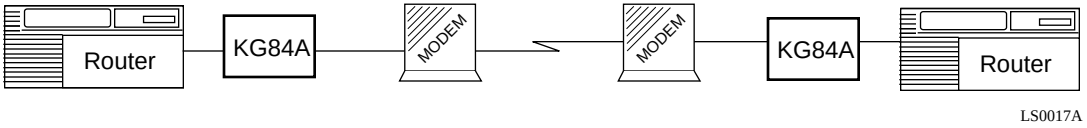

Figure 5-2. KG84A Network Configuration

The Bay Networks router attaches to the KG84A device via a modified V.35 synchronous cable. The encryption/decryption process is usually transparent to the router. However, occasionally two KG84A devices can lose cryptographic synchronization. When this occurs, the modified cable allows the router to initiate cryptographic resynchronization. The modified cable also allows the router to detect and monitor the local KG84A device resynchronization, whether the resynchronization is initiated locally or by a remote KG84A device.

The router detects the loss of synchronization between KG84A devices by monitoring the number of FCS errors and valid frames received. If the router detects FCS errors, and it does not receive a valid frame within a time you specify, the router software requests resynchronization. The router also requests resynchronization if it determines that the previous resynchronization request did not complete before the time you specified.

You can also force a resynchronization of the local KG84A device by pressing its RESYNC button. The router can detect this type of remote resynchronization also, and can request a new resynchronization if one does not complete in the configured time period.

Configure KG84A support on synchronous lines that connect to KG84A cryptographic devices, using the following parameters in the Edit SYNC Parameters window.

- KG84A Cycle
- KG84A Sync Loss Interval
- KG84A Remote Resync Wait
- KG84A Sync Pulse

Note: Be sure to also set the RTS Enable parameter to Enable.

KG84A Cycle

By default, the timer cycle's length is 100 milliseconds. This cycle value is used by the timers on the other KG84A devices on the network. This also becomes the polling cycle for monitoring FCS errors.

You can set the KG84A timer cycle to 5, 10, 25, 50, 100, 200, or 500 milliseconds on this interface.

Site Manager: KG84A Cycle parameter: page A-65

KG84A Sync Loss Interval

By default, the router waits 50 cycles after detecting an FCS error to receive a valid frame before declaring that a loss of synchronization has occurred.

You can set the KG84A loss interval to 5, 10, 25, 50, 100, 200, or 500 cycles on this interface.

Site Manager: KG84A Sync Loss Interval parameter: page A-66

KG84A Remote Resync Wait

By default, the router waits 200 cycles when synchronization is lost and a remotely initiated resynchronization has been detected. You can set the number of cycles that the router waits for the remote KG84A device to complete a resynchronization operation to 2, 5, 10, 25, 50, 100, 200, or 500. After this number of cycles, the router software determines that the resynchronization failed and initiates another resynchronization.

Note that if you press the RESYNC button on the local KG84A device, the router responds as if it detected a remotely initiated resynchronization.

Use different settings at each end of the point-to-point link to avoid a possible race condition.

You can configure the KG84A resynchronization wait on this interface.

Site Manager: KG84A Remote Resync Wait parameter: page A-66

KG84A Sync Pulse

By default, the router transmits a 10-millisecond pulse to the KG84A device when it is necessary to initiate KG84A resynchronization. The router uses the RTS signal of the V.35 interface, which connects to the KG84A device's synchronous signal via a special cable, to initiate KG84A resynchronization. When the router wants to initiate KG84A resynchronization, it changes the value of the synchronous signal from low to high.

The KG84A pulse length is the number of milliseconds that the synchronous signal retains its high value. You can set pulse length from 2 through 4096 milliseconds on this interface.

Site Manager: KG84A Sync Pulse parameter: page A-67

Chapter 6
Configuring MCE1 and MCT1 Interfaces

This chapter describes how to use the Configuration Manager to add Multichannel E1 (MCE1) or Multichannel T1 (MCT1) circuits to a Bay Networks router that contains a MCE1 or MCT1 link module or net module.

Sections of this chapter describe

- Configuring MCE1 and MCT1 Ports
- Configuring Non-PRI Logical Lines
- Configuring ISDN PRI Logical Lines

See Appendix C for information about testing configured MCE1 and MCT1 lines.

Configuring MCE1 and MCT1 Ports

Complete the steps in this section to configure an MCE1 or MCT1 circuit by

1. Selecting the Port Application.
2. Setting the Clock Parameters.
3. Enabling or Disabling the MCE1 Port.
4. Customizing MCE1 Port Details *or* Customizing MCT1 Port Details.

Selecting the Port Application

How you configure an MCE1 or MCT1 interface depends on whether you will use the lines for ISDN Primary Rate Interface (PRI) switched circuits or non-PRI (permanent circuit) applications.

To select the port application using Site Manager:

1. **Click on an unconfigured MCE1 or MCT1 connector in the Configuration Manager window.**

   The Port Application window appears (Figure 6-1.).

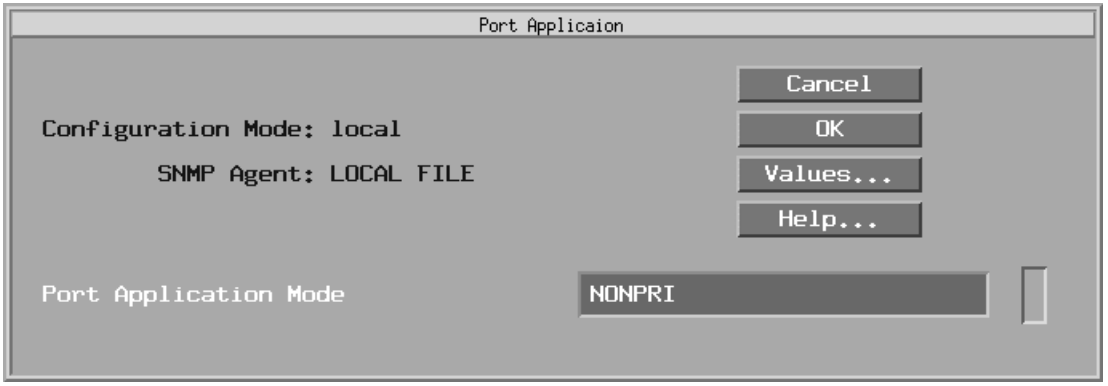

Figure 6-1. Port Application Window

2. **Set the Port Application Mode parameter to NONPRI or PRI.**

   Select NONPRI to indicate that all the lines have a permanent circuit number and are for leased lines, Frame Relay, or permanent connections for other non-ISDN PRI applications.

   Select PRI to indicate that the lines are for switched circuits using ISDN.

Site Manager: Port Application Mode parameter: page A-43 (MCE1)
Site Manager: Port Application Mode parameter: page A-47 (MCT1)

Note: You must configure non-PRI applications with MCE1-I modules. When you configure the MCE1-I module, Site Manager displays a warning to indicate that this version of MCE1 does not support ISDN.

3. **Click on OK.**

   The Edit Clock Parameters parameters window appears. Go to “Setting the Clock Parameters.”

Setting the Clock Parameters

The clock parameters define the timing sources that apply to interfaces (ports) and DS0 timeslots that a MCE1 or MCT1 link or net module supports. How you access the clock parameters depends on whether you are configuring a

- New Quad-Port MCT1 (QMCT1) Module

  The Edit QMCT1 Clock Parameters window appears automatically the first time you configure a port. These clock parameters define the timing sources for the selected interface (port) only.

- New Single- or Dual-Port MCE1 or MCT1 Module

  The Edit DS1E1 Clock Parameters window appears automatically the first time you configure an interface. Dual-port MCE1 and MCT1 link and net modules contain a single clock chip that provides the timing signals for all ports. Therefore, clock parameters that you set for the first port apply to the second port on the module.

- Configured QMCT1 Module

  Once a QMCT1 ports is configured, you customize its clock source as you would any other port parameter. See “Customizing MCT1 Port Details.”

- Configured Single- or Dual-Port MCE1 or MCT1 Module

  To set clock parameters for single and dual-port MCE1 and MCT1 modules, click on the CLOCK connector for the MCE1 or MCT1 module at the Configuration Manager window.

To set the clock parameters from an Edit Clock Parameters window

1. **Set the primary clock source to one of the following:**
   - Select *Internal* to use the clock chip on the link or net module.
   - Select *Port 1 Ext Loop* to use the signal coming in from Port 1.
   - Select *Port 2 Ext Loop* to use the signal coming in from Port 2 (Dual- or Quad-Port Modules only).
   - Select *Port 3 Ext Loop* to use the signal coming in from Port 3 (QMCT1 modules only).
   - Select *Port 4 Ext Loop* to use the signal coming in from Port 4 (QMCT1 modules only).
   - Select *Auxiliary Ext* to use an external source via BNC connectors.

Site Manager: Primary Clock parameter: page A-44 (MCE1)
Site Manager: Primary Clock parameter: page A-48 (MCT1)
Site Manager: Primary Clock parameter: page A-54 (QMCT1)

2. **Set the secondary (backup) clock source, using the same options.**

   The router uses the secondary clock only when the primary clock becomes unavailable.

Site Manager: Secondary Clock parameter: page A-44 (MCE1)
Site Manager: Secondary Clock parameter: page A-48 (MCT1)
Site Manager: Secondary Clock parameter: page A-54 (QMCT1)

3. **Click on OK.**
4. **Continue with**
   - Customizing MCE1 Port Details
   - Customizing MCT1 Port Details

Customizing MCE1 Port Details

You set values for configurable MCE1 line service details and enable or disable the MCE1 interface at the MCE1 Port Parameters window (Figure 6-2). The MCE1 port parameters apply to each of the 31 DS0 channels (timeslots) that an individual MCE1 port (connector) provides.

To customize MCE1 port parameters, select new values for the parameters you want to edit. See the following sections:

- Enabling or Disabling the MCE1 Port
- Setting the Line Type
- Setting the Line Coding Method
- Setting the Alarm Threshold Time
- Setting the Alarm Threshold Clear Time
- Enabling or Disabling the International Bit
- Setting the Line Impedance (ASN MCE1 only)

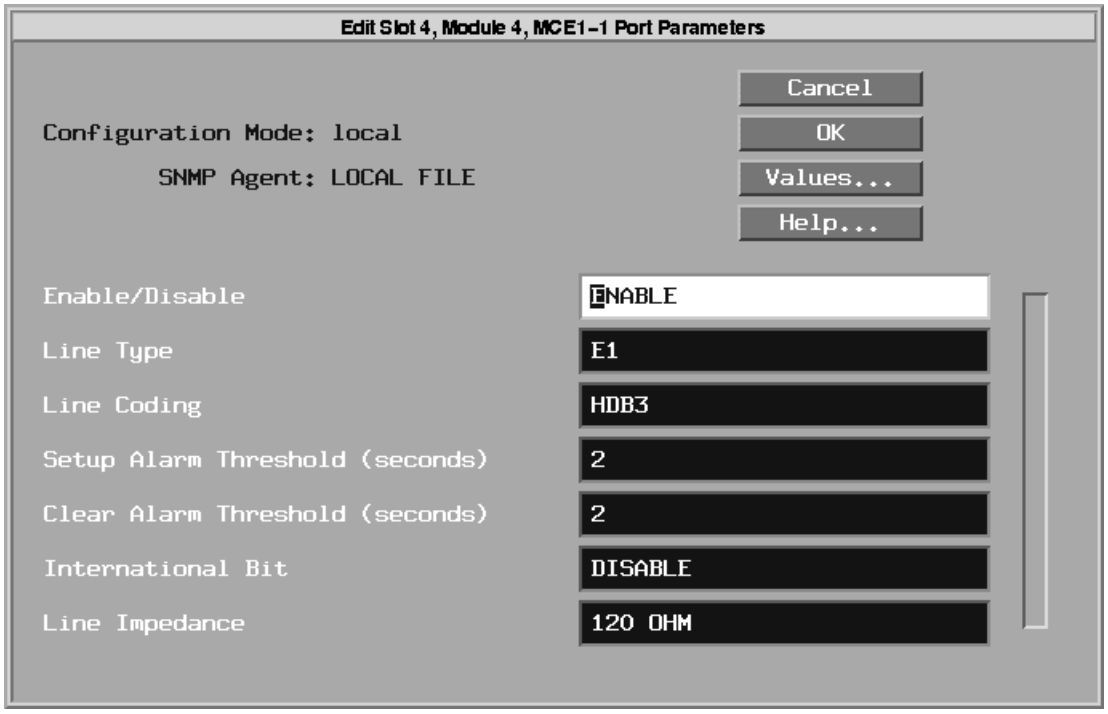

Figure 6-2. MCE1 Port Parameters Window

Enabling or Disabling the MCE1 Port

The MCE1 interface is enabled by default when you add the circuit. You can disable or reenable this MCE1 interface.

Site Manager: Enable/Disable parameter: page A-44

Setting the Line Type

Select one of the following line types to match your E1 equipment:

- E1
- E1 CRC
- E1 MF
- E1 CRC MF

You can set the Line Type for this MCE1 interface.

Site Manager: Line Type parameter: page A-45

Setting the Line Coding Method

By default, the MCE1 interface uses high-density bipolar coding (HDB3) line coding. HDB3 line coding maintains sufficient 1s density within the E1 data stream. It replaces a block of eight consecutive binary 0s with an 8-bit HDB3 code containing bipolar violations in the fourth and seventh bit positions of the substituted code. In the receive direction, the HDB3 code is detected and replaced with eight consecutive binary 0s.

You can select AMI line coding method instead. AMI line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCE1 link module remains synchronized upon receiving up to 45 consecutive 0s.)

You can set the line coding for this MCE1 interface.

Site Manager: Line Coding parameter: page A-45

Setting the Alarm Threshold Time

By default, the MCE1 interface waits 2 seconds before logging a performance defect or anomaly as an event message. You can change that time, the alarm threshold, to any value from 2 through 10 seconds for this MCE1 interface.

Site Manager: Setup Alarm Threshold (seconds) parameter: page A-46

Setting the Alarm Threshold Clear Time

By default, the clear time for performance failure conditions is 2 seconds. If the defect or anomaly clears within this time interval, MCE1 records a performance-cleared condition and logs an event message. You can change the alarm threshold clear time to any value from 2 through 10 seconds for this MCE1 interface.

Site Manager: Clear Alarm Threshold (seconds) parameter: page A-46

Enabling or Disabling the International Bit

By default, the MCE1 interface does not use the international bit in E1 frames. You can enable use of the International Bit for this MCE1 interface.

Site Manager: International Bit parameter: page A-46

Setting the Line Impedance (ASN MCE1 only)

The line impedance for the ASN MCE1 net module is 120 Ohm by default. For the ASN MCE1 net module only, you can change the line impedance to 75 Ohm for an interface.

Site Manager: Line Impedance parameter: page A-47

Customizing MCT1 Port Details

You set values for configurable MCT1 port service details and enable or disable the MCT1 port at the MCT1 Edit Port Parameters window (Figure 6-3). To customize MCT1 port parameters, select new values for the parameters you want to edit. See the following sections:

- Enabling or Disabling the MCT1 Port
- Setting the MCT1 Line Type
- Setting the Line Coding Method
- Setting the Signal Level
- Setting the Alarm Threshold Time
- Setting the Alarm Threshold Clear Time
- Setting the FDL Mode for ESF Line Types
- Setting the Remote FDL HDLC Address Mode
- Enabling or Disabling Loopback Requests
- Setting the Loopback Configuration
- Setting the Source of Send Performance Messages (QMCT1)
- Setting the Source of Accept Performance Messages (QMCT1)
- Setting the Primary Clock Source (QMCT1)
- Setting the Secondary Clock Source (QMCT1)

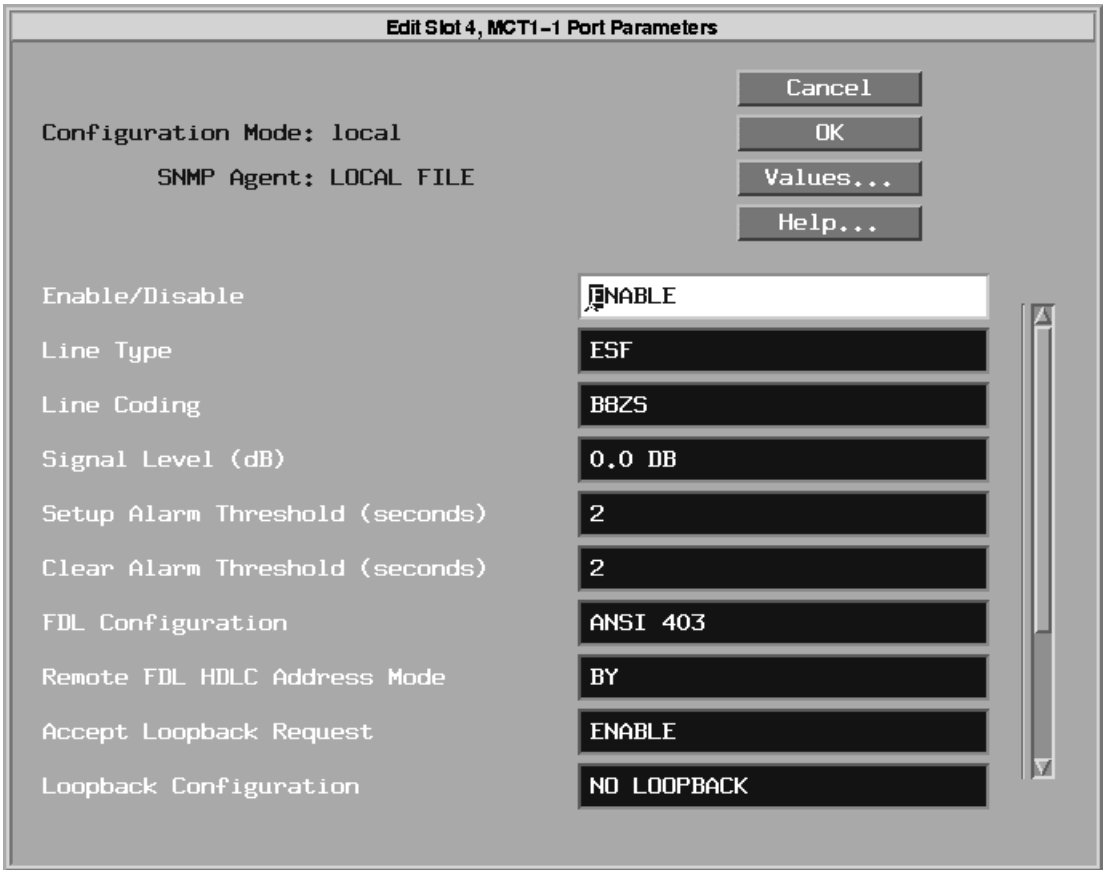

Figure 6-3. MCT1 Port Parameters Window

The MCT1 port parameters apply to each of the 24 DS0 channels (timeslots) that an individual MCT1 interface (connector) provides.

Enabling or Disabling the MCT1 Port

The MCT1 interface is enabled by default when you add the circuit. You can disable or reenable this MCT1 interface without moving physical cabling.

Site Manager: Enable/Disable parameter: page A-48

Setting the MCT1 Line Type

Select one of the following line types (framing formats) for your T1 equipment:

- ESF -- Transmits superframes, each consisting of 24 individual SF/D4 frames. Provides enhanced signaling and synchronization.
- SF/D4 -- Transmits superframes, each consiting of 12 individual frames.
- Unframed T1 -- Available only when the BERT Mode parameter is enabled. See “Enabling or Disabling BERT Mode (QMCT1 only)” later in this chapter.

You can set the Line Type for this MCT1 interface.

Site Manager: Line Type parameter: page A-49

For ESF lines, you can also set the Facility Data Link (FDL) mode.

Setting the FDL Mode for ESF Line Types

The MCT1 interface selects a Facility Data Link (FDL) mode only when the line is configured with an ESF line type. You can select one of the following ESF line types:

- ANSI 403 -- the default

  ANSI 403 mode, conforms to the 1989 ANSI T1.403 specification (*Carrier-to-Customer Installation DS1 Metallic Interface*).

- AT&T 54016

  AT&T 54016 conforms to the 1989 AT&T specification (*Requirements for Interfacing Digital Terminal Equipment to Services Employing the Extended Superframe Format*).

Site Manager: FDL Configuration parameter: page A-51

Setting the Line Coding Method

By default, the MCT1 interface uses bipolar with 8-zero substition (B8ZS) line coding. B8ZS line coding replaces a block of eight consecutive binary 0s with an 8-bit B8ZS code containing bipolar violations in the fourth and seventh bit positions of the substituted code. In the receive direction, the B8ZS code is detected and replaced with eight consecutive binary 0s.

You can select AMI line coding method instead. AMI line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCE1 link module remains synchronized upon receiving up to 45 consecutive 0s.)

You can set the line coding for this MCE1 interface.

Site Manager: Line Coding parameter: page A-49

Setting the Signal Level

The Signal Level parameter specifies the T1 transmit power level in decibels (dB).

The DS1 values of -15 and -7.5 dB are long-haul and the carrier determines these values if 0.0 dB is not sufficient.

The DSX1 values of 0.0, 0.5, 0.8, 1.1, and 1.5 dB are short-haul, and correlate with cable length as follows:

- 0.0 dB -- 0 to 133 ft.
- 0.5 dB -- 133 to 255 ft.
- 0.8 dB -- 266 to 399 ft.
- 1.1 dB -- 399 to 533 ft.
- 1.5 dB -- 533 to 655 ft.

By default, the signal level is set to 0.0 dB. You can set the signal level for this MCT1 interface.

Site Manager: Signal Level (dB) parameter: page A-50

Setting the Alarm Threshold Time

By default, the MCT1 interface waits 2 seconds before logging a performance defect or anomaly as an event message. You can change that time to any value from 2 through 10 seconds.

You can set the alarm threshold for this MCT1 interface.

Site Manager: Setup Alarm Threshold (seconds) parameter: page A-50

Setting the Alarm Threshold Clear Time

By default, the clear time for performance failure conditions is 2 seconds. If the defect or anomaly clears within this time interval, MCT1 records a performance-cleared condition and logs an event message. You can change the alarm threshold clear time to any value from 2 through 10 seconds.

You can set the alarm threshold clear time for this MCT1 interface.

Site Manager: Clear Alarm Threshold (seconds) parameter: page A-51

Setting the Remote FDL HDLC Address Mode

You can select the FDL address mode to determine how the near-end FDL responds to HDLC addressesin messages from the far-end FDL

You can set the FDL address mode to BY or AZ for this MCT1 interface.

Site Manager: Remote FDL HDLC Address Mode parameter: page A-51

Enabling or Disabling Loopback Requests

By default, the MCT1 interface accepts and complies with requests to go into loopback mode from a far-end device. You can disable detection of loop-up and loop-down code detection circuitry to prevent the interface from accepting loopback requests.

You can disable or reenable loopback requests on this interface.

Site Manager: Accept Loopback Request parameter: page A-52

Setting the Loopback Configuration

You can set the way that an MCT1 interface handles loopback signals by specifying one of the following options:

- *Payload Loopback* -- The received signal at this interface is looped through the device. Typically the received signal is looped back for retransmission after it has passed through the device's framing function.
- *Line Loopback* -- The received signal does not go through the framing device (minimum penetration) but is looped back out.

Setting this parameter forces the DS1 interface into loopback. The far-end or intermediate equipment then performs diagnostics on the network between that equipment and the DS1 interface.

You can set the loopback configuration for this interface.

Site Manager: Loopback Configuration parameter: page A-52

Setting the Source of Send Performance Messages (QMCT1)

For QMCT1 link modules only, you can specify the source of performance messages:

- *Customer Inst* indicates that the customer installation supplies the messages.
- *Carrier* indicates that the carrier supplies the messages.

Site Manager: Send Performance Measurement CR Addr parameter: page A-53

Setting the Source of Accept Performance Messages (QMCT1)

For QMCT1 link modules only, you can specify the source from which the router accepts performance messages:

- *Customer Inst* indicates that the router accepts messages only from the customer installation.
- *Carrier* indicates that the router accepts messages only from the carrier.

Site Manager: Accept Loopback Request parameter: page A-52

Setting the Primary Clock Source (QMCT1)

You can specify the primary source for timing signals:

- Select *Internal* to use the clock chip on the MCT1 module.
- Select *Port 1 Ext Loop* to use the signal coming in from Port 1.
- Select *Port 2 Ext Loop* to use the signal coming in from Port 2.
- Select *Port 3 Ext Loop* to use the signal coming in from Port 3.
- Select *Port 4 Ext Loop* to use the signal coming in from Port 4.
- Select *Auxiliary Ext* to use an external source via BNC connectors.

Site Manager: Primary Clock parameter: page A-54

Setting the Secondary Clock Source (QMCT1)

You can specify a backup source for timing signals:

- Select *Internal* to use the clock chip on the link or net module.
- Select *Port 1 Ext Loop* to use the signal coming in from Port 1.
- Select *Port 2 Ext Loop* to use the signal coming in from Port 2.
- Select *Port 3 Ext Loop* to use the signal coming in from Port 3.
- Select *Port 4 Ext Loop* to use the signal coming in from Port 4.
- Select *Auxiliary Ext* to use an external source via BNC connectors.

Site Manager: Secondary Clock parameter: page A-54

Configuring Non-PRI Logical Lines

Logical lines are the logical paths for data communications on a physical connection. Add logical lines for an MCE1 or MCT1 port by

1. Defining Logical Lines
2. Customizing Logical Lines
3. Assigning Timeslots

After you customize the port parameters for a non-PRI circuit, the MCE1 or MCT1 Logical Lines window appears (Figure 6-4).

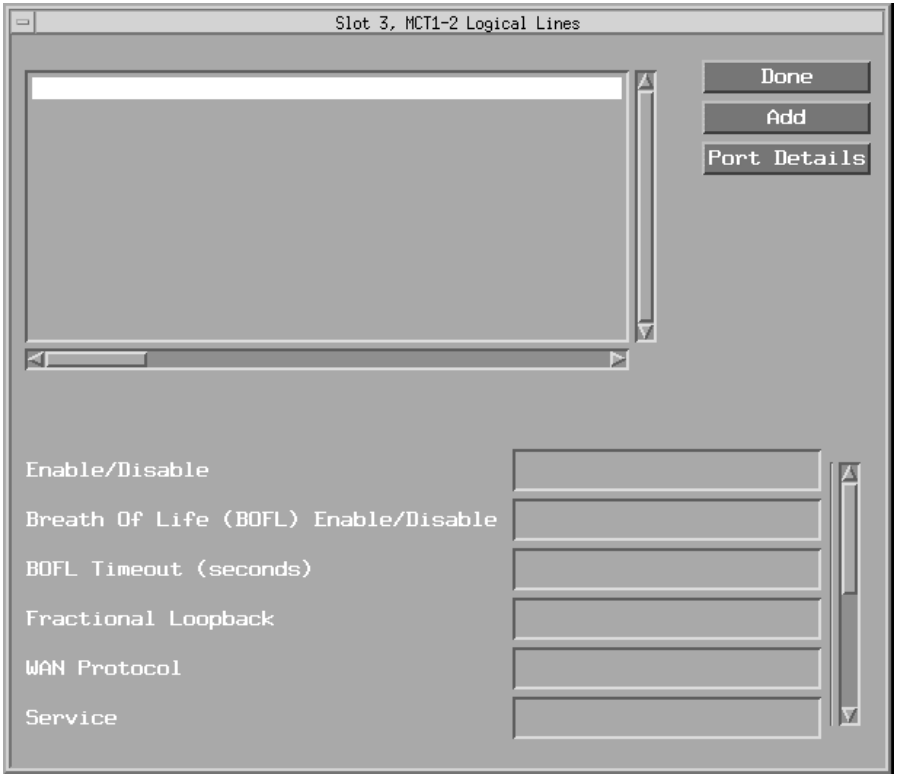

Figure 6-4. Logical Lines Window before Defining a Circuit (MCT1 example)

Defining Logical Lines

To add the logical lines for an MCE1 or MCT1 port:

1. **Start at the MCE1 or MCT1 Logical Lines Window (refer to Figure 6-4).**
2. **Click on Add.**

   The Add Circuit window appears (Figure 6-5).

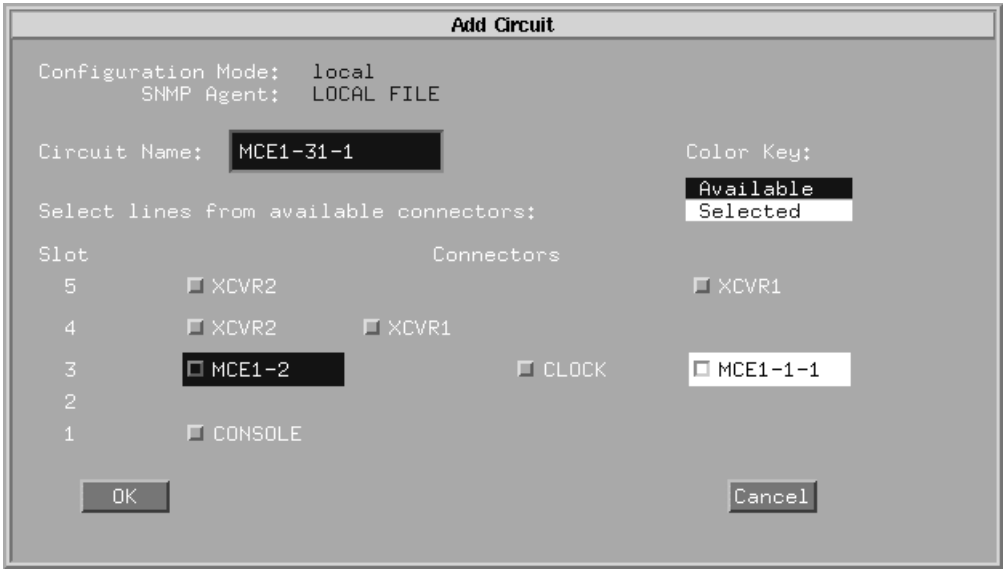

Figure 6-5. Add Circuit Window (MCE1 example)

3. **Name the logical line.**

   You can use the default name that appears in the Add Circuit window, or change the name by clicking on the Circuit Name box and typing in a new name.

   Figures 6-6 and 6-7 illustrate how Site Manager generates the default logical line name. The default name identifies the circuit type (MCE1 or MCT1), the physical connector (slot and port number), the number of the logical line on the MCE1 or MCT1 port, and -- in the case of ASN net modules -- the module number.

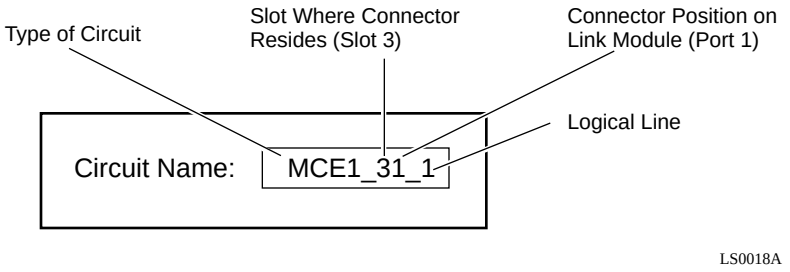

Figure 6-6. Default Circuit Name for Link Modules

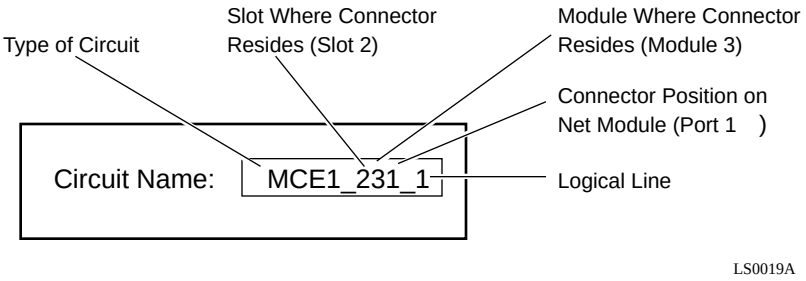

Figure 6-7. Default Circuit Name for ASN Net Modules

4. **Click on OK.**

   The WAN Protocols window appears.

5. **Select the WAN protocol and click on OK.**

   Refer to *Configuring Routers* and to the appropriate protocol configuration guide for information about selecting WAN protocols.

   The Select Protocols window appears.

6. **Select the protocols to run on this logical line.**

   Refer to the appropriate protocol configuration guide for instructions.

   When you have finished, the Logical Lines window appears, showing the first MCE1 or MCT1 circuit (Figure 6-8).

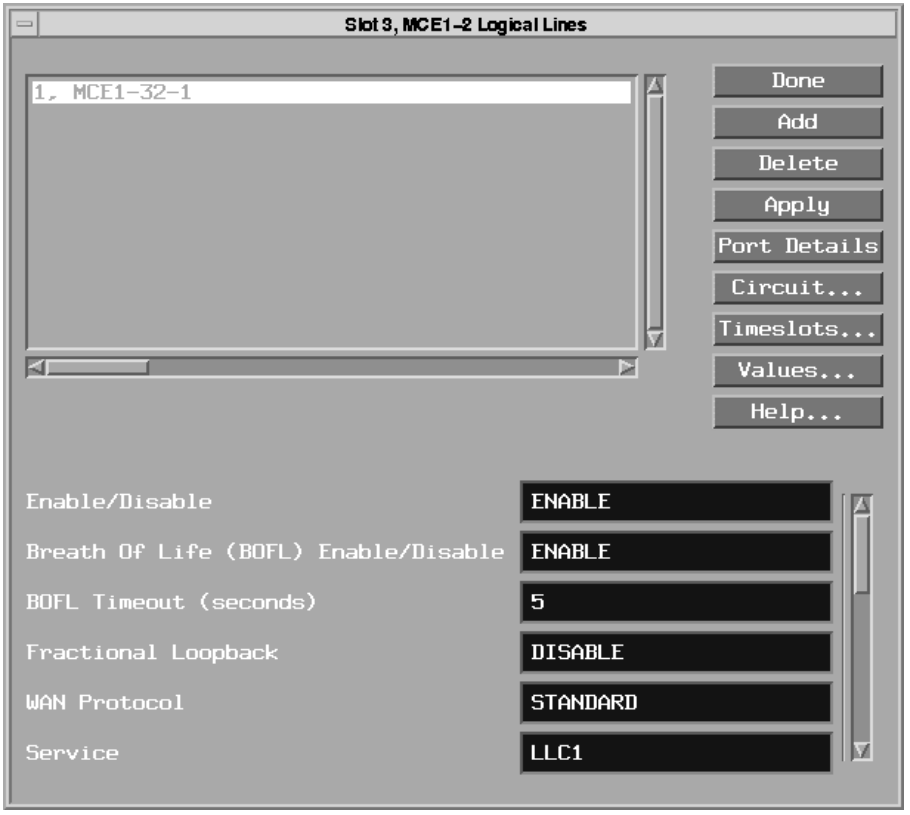

Figure 6-8. Logical Lines Window with One Circuit Defined (MCE1 example)

7. **Repeat Steps 2 through 6 for each logical line that you want to create.**

A single MCE1 port supports up to 31 logical lines. A single MCT1 port supports up to 24 logical lines.

Note: If you want to group the logical lines into a multiline circuit, see "Grouping Logical Lines into a Multiline Circuit," in Chapter 7.

Customizing Logical Lines

After you finish adding the logical lines for a non-PRI interface, the MCE1or MCT1 Logical Lines window displays each logical line (refer to Figure 6-8). This window also displays the parameter values for the highlighted logical line. Use the scroll bar in the Logical Lines window to view additional logical line parameters.

To edit parameters for a logical line:

1. **Select the line and circuit name from the logical line list.**

   Site Manager displays the circuit's parameters.

2. **Edit the parameters that you want to change.**

   See the following sections:

   - Enabling or Disabling the Logical Line
   - Enabling or Disabling Breath of Life (BofL) Messages
   - Setting the BofL Timeout
   - Enabling or Disabling Diagnostic Loopback
   - Viewing the Configured WAN Protocol
   - Setting the HDLC Service Type
   - Setting the Local HDLC Address
   - Setting the Remote HDLC Address
   - Setting Rate Adaptation
   - Setting the Interframe Time Fill Pattern
   - Setting the CRC Size
   - Setting the MTU Size
   - Enabling or Disabling Remote Loopback Detection
   - Enabling or Disabling BERT Mode (QMCT1 only)
   - Setting the BERT Test Pattern (QMCT1 only)
   - Enabling or Disabling Fractional T1 Loopback Code (QMCT1 only)
   - Accessing Line Resource Reservation (QMCT1 only)

3. **Click on Apply.**

Enabling or Disabling the Logical Line

The logical line is enabled by default. You can disable or reenable each logical line.

Site Manager: Enable/Disable parameter: page A-38

Enabling or Disabling Breath of Life (BofL) Messages

Transmission of BofL packets is enabled by default on a logical line. A BofL packet is sent out on the wire as often as the value you specify for the BofL Timeout.

You can disable or reenable BofL messages on the logical line.

Site Manager: Breath of Life (BofL) Enable/Disable parameter: page A-38

Setting the BofL Timeout

The time period between BofL packets is 5 seconds by default. You can change the BofL timeout to any value from 1 through 60 seconds.

You can set the period between BofL messages on the logical line.

Site Manager: BofL Timeout parameter: page A-38

Enabling or Disabling Diagnostic Loopback

In diagnostic loopback mode, the router retransmits received data to the sender. Loopback mode is disabled by default.

You can specify whether or not to use diagnostic loopback mode on the logical line.

Site Manager: Fractional Loopback parameter: page A-39

Viewing the Configured WAN Protocol

You can view which WAN protocol is configured on this logical line. Do not change the current value.

Caution: Changing the WAN protocol does not reconfigure the interface, and could disable it.

To change the configured WAN protocol for an interface, first delete and then reconfigure the circuit.

Site Manager: WAN Protocol parameter: page A-37

Setting the HDLC Service Type

The logical line HDLC service is LLC1 by default. LLC1 adds the HDLC address and control fields as a prefix to the frame. You can change the service to basic HDLC (Transparent), based on the requirements of the E1 equipment.

You can set the HDLC service for this logical line.

Site Manager: Service parameter: page A-39

Setting the Local HDLC Address

Specify the 1-byte HDLC address of this logical line, as follows:

- DCE
- DTE
- An explicit address value: 2, 4, 5, 6, or 7

Use unique HDLC addresses for the local and remote interfaces at either end of the point-to-point circuit. For example, if the remote address is DTE, configure the local address as DCE.

If you configure X.25 on this line, set this parameter to either DCE or DTE.

Site Manager: Local HDLC Address parameter: page A-40

Setting the Remote HDLC Address

Specify the 1-byte HDLC address of the remote MCE1 interface as follows:

- DCE
- DTE
- An explicit address value: 2, 4, 5, 6, or 7

Use unique HDLC addresses for the local and remote interfaces at either end of the point-to-point circuit. For example, if the local address is DTE, configure the remote address as DCE.

If you configure X.25 on this line, set this parameter to either DCE or DTE.

Site Manager: Remote HDLC Address parameter: page A-40

Setting Rate Adaptation

Rate adaption determines the number of bits and their bit positions within the timeslot. The MCE1 logical line rate adaption is 64 K by default. You can select

- 64 K
- 56 K MSB
- 56 K LSB

The 64 K selection uses all eight bits in the timeslot. The two 56 K selections use seven of the eight bits in the timeslot. The 56 K MSB selection does not use the most significant bit, and the 56 K LSB selection does not use the least significant bit in the timeslot.

You can select the line rate adaptation for this logical line.

Site Manager: Rate Adaptation parameter: page A-40

Setting the Interframe Time Fill Pattern

You can select the interframe time fill pattern for transmission across this logical line.

- *Flags* selects an 0x7E pattern (0 1 1 1 1 1 1 0).
- *Idles* selects an 0xFF pattern (1 1 1 1 1 1 1 1).

The router uses Flags by default. You can set the line interframe time-fill character.

Site Manager: Interframe Time Fill Character parameter: page A-41

Setting the CRC Size

By default, the routers uses the 16-bit cyclic redundancy check (CRC) type. With 16-bit CRC, the router appends a 16-bit CRC to the transmitted frames and performs a 16-bit CRC on received frames. You can change to 32-bit CRC, where the router appends a 32-bit CRC to transmitted frames and performs a 32-bit CRC on received frames.

You can set CRC size for the logical line.

Site Manager: CRC Size parameter: page A-41

Setting the MTU Size

The router uses the transmit/receive buffer size (MTU) to configure the largest frame that the router can transmit or receive across this MCE1 port. The router discards frames larger than this value. The MTU is 1600 bytes by default. You can change it to any size from 3 through 4608 bytes for the logical line.

Site Manager: MTU Size (bytes) parameter: page A-41

Enabling or Disabling Remote Loopback Detection

Setting Remote Loopback Detection enables or disables detection of the driver's own BofL packets, as long as the BofL Enable/Disable parameter is enabled for this interface. If you select Enable and put the line into loopback mode, the downstream driver will bring down the interface when it detects its own BofL packet.

You can disable or reenable loopback detection on this interface.

Site Manager: Remote Loopback Detection parameter: page A-42

Enabling or Disabling BERT Mode (QMCT1 only)

You can disable or reenable bit error rate test (BERT) mode on this interface.

Site Manager: BERT Mode parameter: page A-42

See Appendix C, “Testing MCE1 and MCT1 Interfaces” for detailed information about BERT testing.

Setting the BERT Test Pattern (QMCT1 only)

When a port is in BERT mode, it can generate patterns such as all 1s, all 0s, or a QRSS (quasi-random signal sequence) pattern. Valid test pattern options are:

- Zero
- Ones
- QRSS
- 2e15
- 2e15 Inverted
- 2e20
- 2e23
- 2e23 Inverted

You can specify the bit pattern transmitted during BERT diagnostics.

Site Manager: BERT Test Pattern parameter: page A-42

See Appendix C, “Testing MCE1 and MCT1 Interfaces” for detailed information about BERT testing.

Enabling or Disabling Fractional T1 Loopback Code (QMCT1 only)

Fractional T1 loopback is an ANSI-standard 127 octet loop. Enabling fractional T1 loopback detection (channel loopback) allows remote test equipment to put one logical line or DS0 group on a port into loopback testing mode without affecting the other logical lines or channels.

Fractional T1 loopback also enables a QMCT1 port to generate and send test patterns to the remote test equipment and verify that the pattern is received and looped back.

For QMCT1 modules only, you can disable or reenable fractional loopback detection on this interface.

Site Manager: Remote Loopback Detection parameter: page A-42

See Appendix C, “Testing MCE1 and MCT1 Interfaces” for detailed information about testing using fractional loopback.

Accessing Line Resource Reservation (QMCT1 only)

This parameter allows you to edit ST2 line reservation resources if the ST2 service is enabled on the line. Refer to “Starting the LRM” in Chapter 8 for information.

Assigning Timeslots

After configuring the logical lines, you must assign timeslots (also called *channels* or *DS0*s) for the interface. To assign timeslots:

1. **Start at the MCE1 or MCT1 Logical Lines window.**
2. **Click on Timeslots.**

   The MCE1 Timeslots or the MCT1 Timeslots window (Figure 6-9) appears.

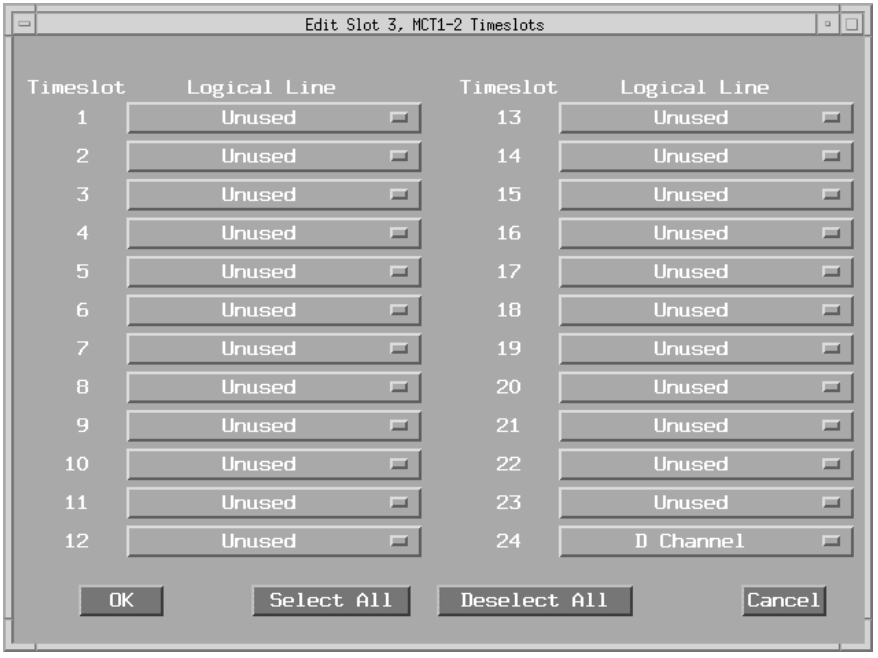

Figure 6-9. Timeslots Window (MCT1 Example)

This window graphically represents the timeslots (31 for MCE1, 24 for MCT1).

3. **Click on an Unused timeslot.**

   A list of possible logical lines to which you can assign the timeslot appears (Figure 6-10).

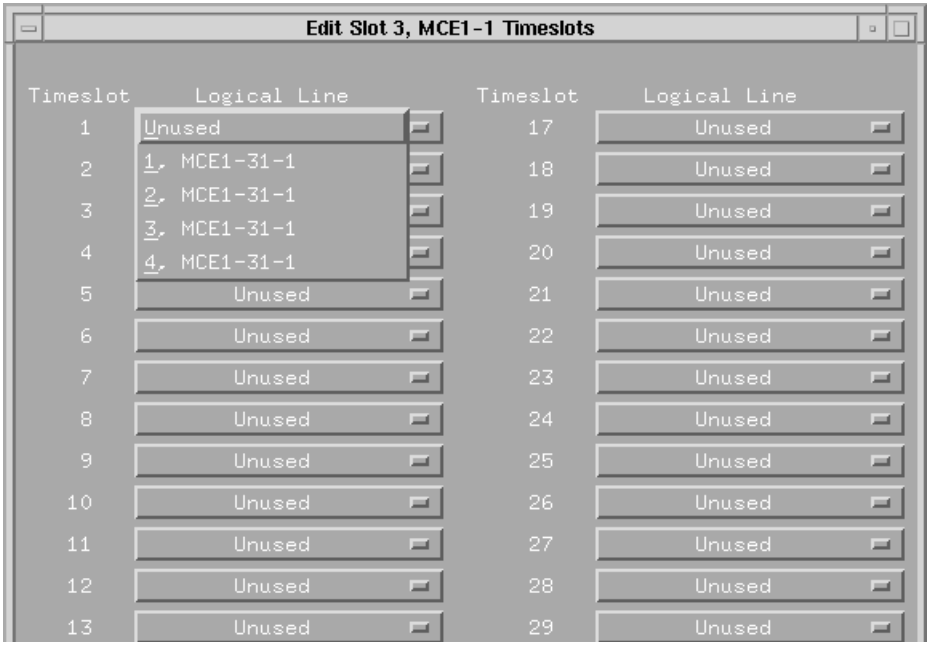

Figure 6-10. Assigning a Timeslot (MCE1 Example)

4. **Select the logical line to which you want to assign the timeslot.**
5. **Repeat Steps 3 and 4 for each timeslot that you want to assign, or click on Select All to assign all timeslots to a logical line.**

Note: For MCE1 circuits, timeslot 16 is unavailable when the Line Type parameter in the MCE1 Port Parameters window (refer to Figure 6-2) is set to E1 MF or E1 CRC MF.

6. **Click on OK.**

   The MCE1 or MCT1 Logical Lines window appears.
7. **Click on Apply.**
8. **Click on Done.**

   The Configuration Manager window appears.

Configuring ISDN PRI Logical Lines

To configure ISDN PRI logical lines:

1. **Start at the PRI Logical Lines window (Figure 6-11).**

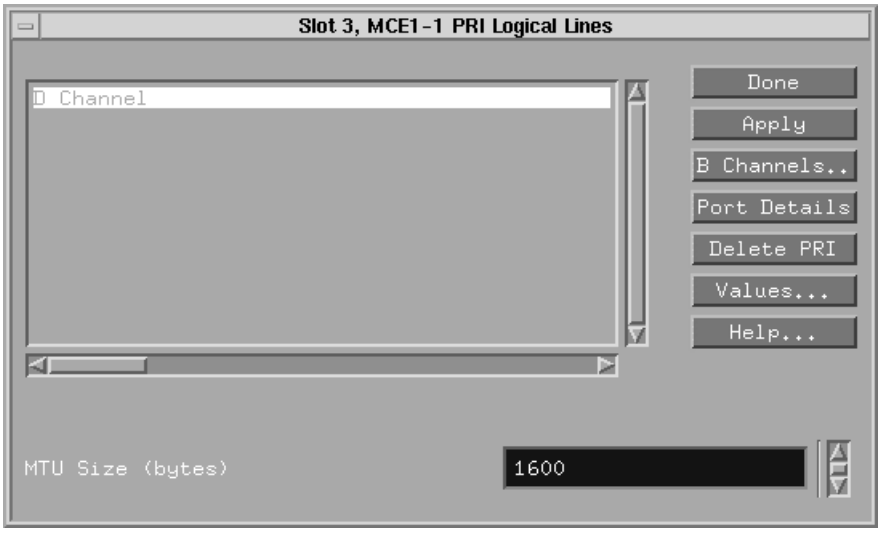

Figure 6-11. PRI Logical Lines Window (MCE1 Example)

2. **Click on B-Channels.**

   The MCE1 Timeslots (Figure 6-12) or MCT1 Timeslots window appears.

   This window graphically represents the timeslots (31 for MCE1, 24 for MCT1).

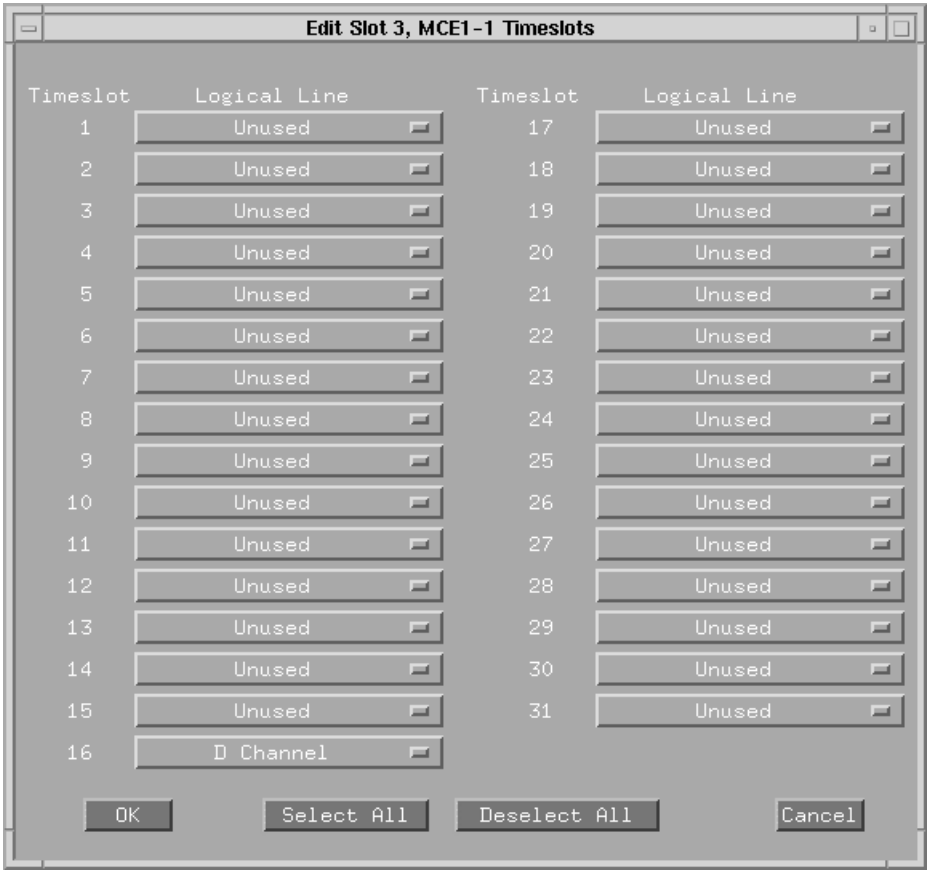

Figure 6-12. MCE1 Timeslots Window (ISDN PRI Configurations)

3. **Click on a timeslot to assign.**
4. **Select B-Channel.**
5. **Repeat Steps 3 and 4 for each timeslot that you want to assign, or click on Select All to assign all timeslots to the B-Channel.**
6. **Click on OK.**

   The MCE1 PRI Logical Lines window reappears.

7. **Select the B-Channel in the scroll box.**

8. **Edit the MTU Size (byte) parameter for the B-Channel.**

   The router uses the Maximum Transmission Unit (MTU) to configure the largest frame that the logical line can transmit or receive. The PRI MTU is 1600 bytes by default. You can change it to any size from 3 through 4608 bytes.

Site Manager: MTU Size (bytes) parameter: page A-41

9. **Click on Apply.**

10. **Click on Done.**

    The Configuration Manager window appears.

Chapter 7
Configuring Multiline Services

This chapter describes how to configure multiline services over the following types of WAN media:

- Synchronous (Bay Networks Standard, PPP, and Frame Relay protocols)
- T1/E1
- MCE1/MCT1
- HSSI

Topics in this chapter include

- Overview of Multiline Configurations
- Configuring Multiline

Overview of Multiline Configurations

A *multiline* configuration is a circuit that consists of more than one WAN *data path*. A data path is a connection between two points, and can be a permanent physical line, a dial-up physical line, or a virtual circuit connection.

Read this section for information about multiline configurations:

- Benefits of a Multiline Configuration
- Multiline Example
- Types of Multiline Circuits
- Grouping Data Paths
- Multiline Traffic Distribution
- Frame Relay Considerations

- PPP Multilink
- Bandwidth-on-Demand (BOD)

Benefits of a Multiline Configuration

Using a multiline configuration rather than a single path provides the following advantages

- Greater *bandwidth* between two sites

  Bandwidth is the rate at which traffic travels on the circuit. A multiline circuit has greater bandwidth because traffic can travel via more than one data path.

- Greater degree of fault tolerance

  In a multiline configuration, multiple data paths exist for a single circuit. Consequently, if one data path becomes disabled, traffic can travel over another data path.

The example in the next section illustrates the benefits of using multiline services.

Multiline Example

Suppose that your network uses Bay Networks routers to connect two sites, one in New York City and one in Los Angeles (Figure 7-1). A high volume of important data travels between the two sites via three synchronous lines.

Grouping the three synchronous lines into one multiline circuit would

- Reduce congestion by distributing the volume of traffic more evenly among the three lines.
- Decrease the chance of data loss if a connection fails.

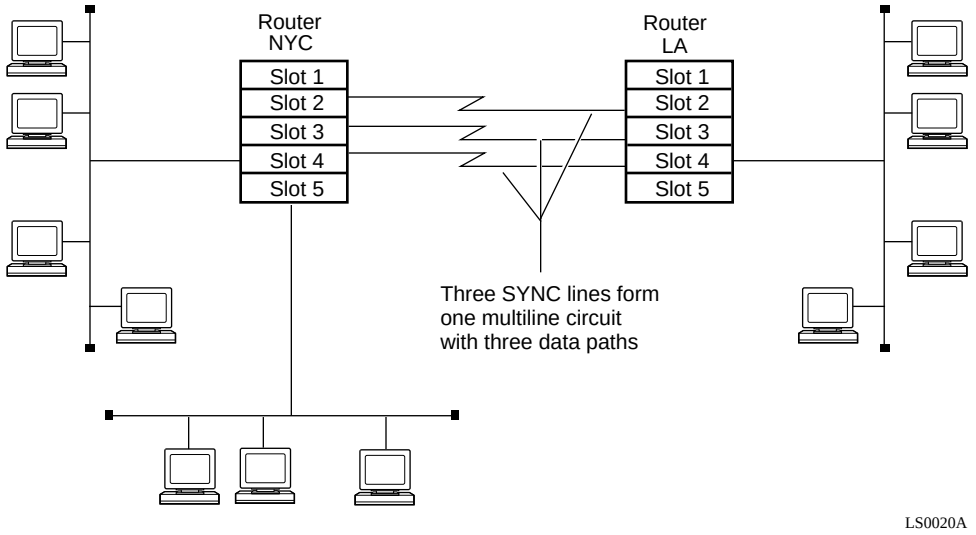

Figure 7-1. Multiline Circuit Composed of Three Synchronous Lines

Types of Multiline Circuits

There are two types of multiline circuits:

- Circuits that include several physical lines
- Circuits on one physical line with several data paths that have separate addresses

In Figure 7-2, Multiline Circuit A groups three synchronous lines into one circuit. Multiline Circuit B consists of just one physical synchronous line, but has three data paths with separate addresses.

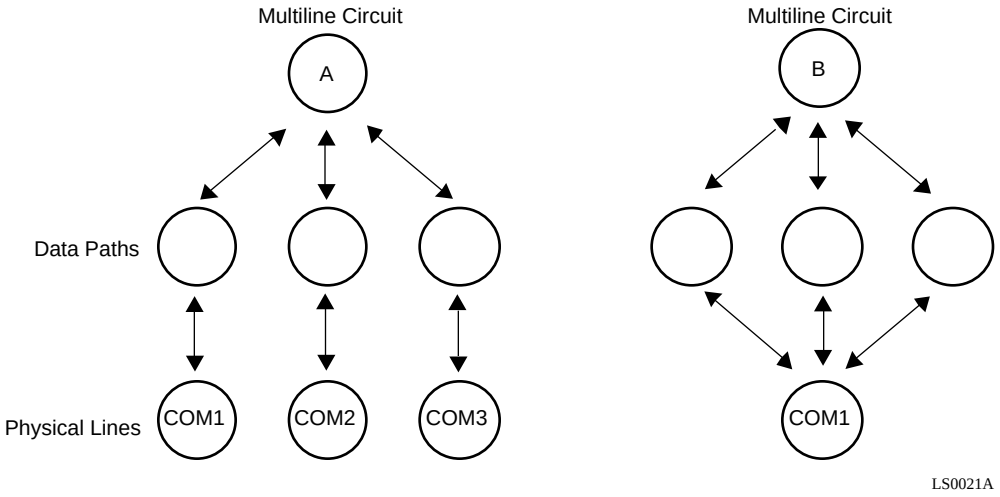

Figure 7-2. Multiline Circuit Types

A multiline circuit reacts to individual data paths coming up and going down by adding to and subtracting from its pool of active data paths, and can operate with some of its data paths down.

Grouping Data Paths

The data paths that form a multiline circuit must share the same bandwidth, Maximum Transmission Unit (MTU), and encapsulation method. T1, E1, MCT1, MCE1, HSSI, and Bay Networks Standard synchronous lines share the same encapsulation method, so you can group any of these lines to form a multiline circuit as long as they share the same bandwidth and MTU.

Frame Relay and PPP each have unique encapsulation methods. You cannot mix these line types with any other line type when you create a multiline circuit.

Multiline Traffic Distribution

To distribute traffic among multiline data paths, you can use one of the following methods:

- Address-based Selection
- Random Selection

You select the data path for a line.

Site Manager: Data Path Chooser parameter: page A-74

Address-based Selection

If you choose address-based selection, the router determines the appropriate data path for outbound traffic from the source and destination addresses in individual packets. The router always uses the same data path for any given address pair.

The router determines whether to route or bridge the packet, and then uses the appropriate address. It uses the routing-level addresses for routing traffic, and the MAC-level addresses for bridging traffic.

Address-based selection ensures that all outbound traffic to a particular endstation travels on the same data path, and that packets arrive in the correct sequence. Use this method for protocols that cannot receive packets out of sequence. Note, however, that this option may not result in even traffic distribution across all data paths.

Note: Address-based selection cannot be used with Frame Relay in group or hybrid access mode. Traffic distribution is automatically changed to random selection.

Random Selection

If you choose Random selection, the router determines the data path for outbound traffic by using random number generation. With this method, the router

1. Assigns a set of numbers to each data path.
2. Generates a random number for each outbound packet.
3. Sends the packet via the data path with the matching number.

Note: Random selection provides even distribution across all active data paths in the topology; however, packets traveling on different paths can arrive at their destination out of sequence. Some protocols cannot tolerate packets arriving out of sequence, and as a result, you can experience poor performance or failures. Be sure that random selection is appropriate for your application.

Frame Relay Considerations

You can configure multiline services for both group access mode and direct access mode Frame Relay PVCs. For more information on using multiline services with Frame Relay, refer to *Configuring Frame Relay Services*.

PPP Multilink

The Bay Networks implementation of PPP includes a *multilink* feature. Multilink is similar to multiline; multilink, however, provides the ability to

- Group lines of different speeds
- Preserve packet sequencing
- Distribute traffic more evenly among the data paths
- Monitor traffic volume

Multilink is particularly beneficial when you configure circuits to access *bandwidth-on-demand* (BOD). For more information on the PPP multilink feature, refer to *Configuring PPP Services*.

Bandwidth-on-Demand (BOD)

You can configure Bay Networks routers to access BOD to reduce line congestion. This feature enables the router to access secondary dial-up lines when the primary leased or dial-up line becomes congested. The router can then transmit excess traffic over the secondary switched lines.

For more information on BOD, refer to *Configuring Dial Services*.

Configuring Multiline

The method you use to configure a multiline circuit depends on the types of lines you need to group.

- For information on how to group logical lines into a multiline circuit, go to "Grouping Logical Lines into a Multiline Circuit" on page 7-12.
- For information on how to group physical synchronous lines into a multiline circuit, see "Grouping Physical Synchronous Lines into a Multiline Circuit" on page 7-7 or "Adding Physical Synchronous Lines to a Circuit" on page 7-9.
- For information about how to use multiline with Frame Relay, refer to *Configuring Frame Relay Services.*

Grouping Physical Synchronous Lines into a Multiline Circuit

To group up to 16 physical synchronous lines into a multiline circuit:

1. **Start at the Configuration Manager window.**
2. **Click on the appropriate link module connector.**

   You must select an E1, T1, MCT1, MCE1, HSSI, or synchronous link or net module connector.

   The Add Circuit window appears (Figure 7-3).

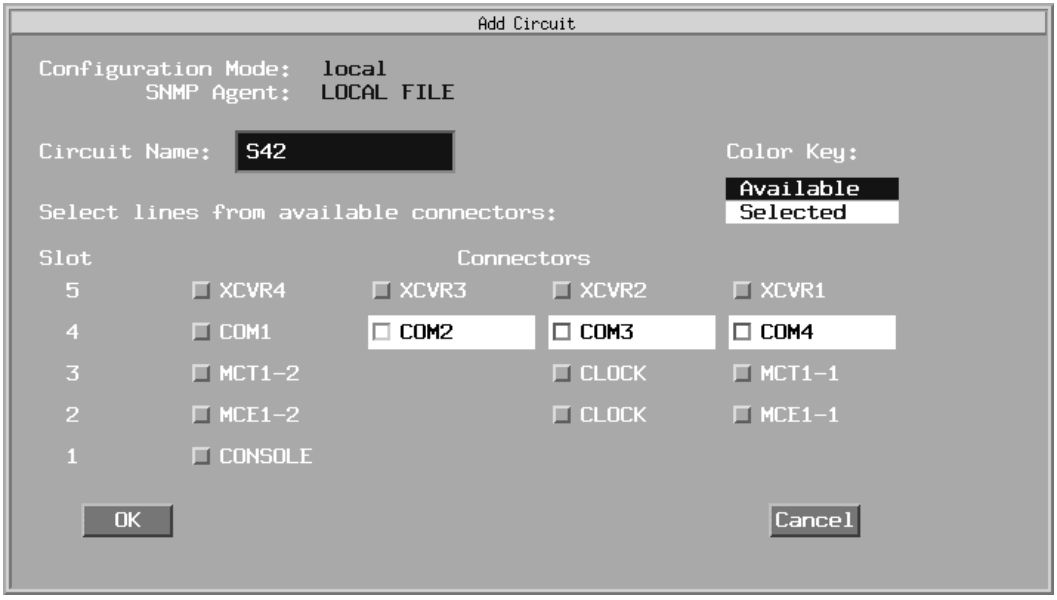

Figure 7-3. Add Circuit Window

3. **Click on the other connectors that you want to add to the multiline circuit.**

   You must again select E1, T1, MCT1, MCE1, HSSI, or Synchronous link module connectors.

4. **Click on OK.**

   The connectors that you selected now form a group with a single circuit name. For example, in Figure 7-3, the lines connecting to COM2, COM3, and COM4 now form one circuit called S42, which distributes traffic using address pairs. To change the default traffic distribution method, go to "Changing the Traffic Distribution Method," later in this chapter.

5. **Add the necessary protocols to this circuit.**

   See *Configuring Bridging Services* or the appropriate routing protocol guide for instructions.

Adding Physical Synchronous Lines to a Circuit

The data paths that form a multiline circuit must share the same bandwidth, Maximum Transmission Unit (MTU), and encapsulation method. T1, E1, MCT1, MCE1, HSSI, and Bay Networks Standard synchronous lines share the same encapsulation method, so you can group any of these lines to form a multiline circuit as long as they share the same bandwidth and MTU.

To add a physical synchronous line to an existing circuit on which you have configured protocols:

1. **Start at the Configuration Manager window.**
2. **Click on the connector of the circuit to which you are adding lines.**

   The Edit Connector window appears.
3. **Click on Edit Circuit.**

   The Circuit Definition window appears (Figure 7-4).

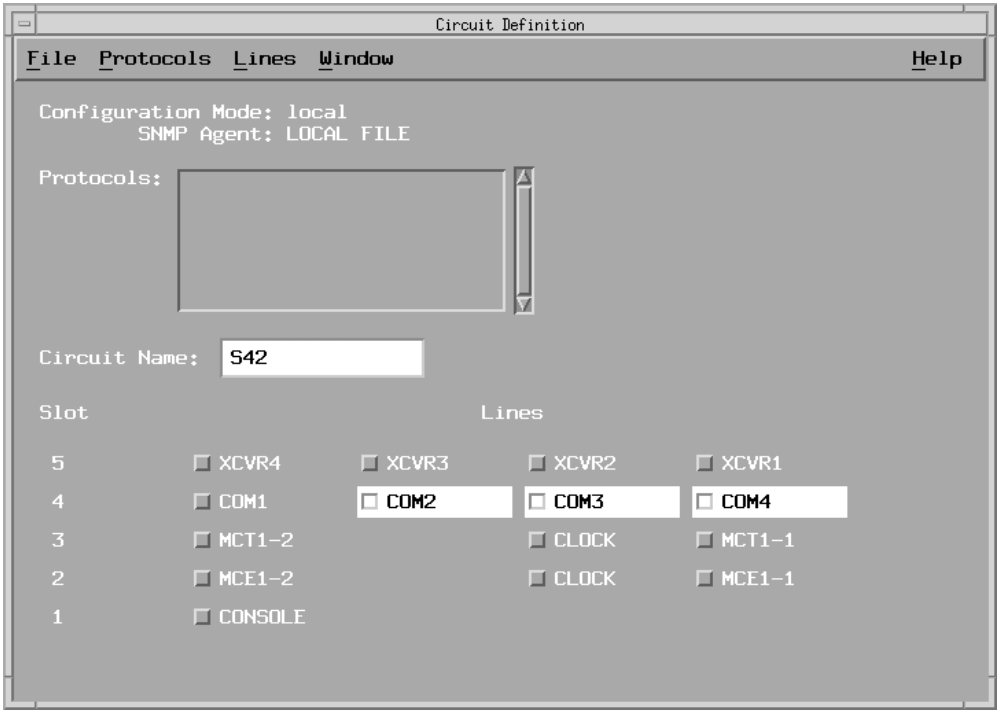

Figure 7-4. Circuit Definition Window

4. **Click on the connectors that you are adding to the circuit.**

   Site Manager highlights the connectors you choose. For example, Figure 7-4 illustrates the addition of COM2 to the circuit S42 that already uses connectors COM3 and COM4.

5. **Select Lines > Change Lines (Figure 7-5).**

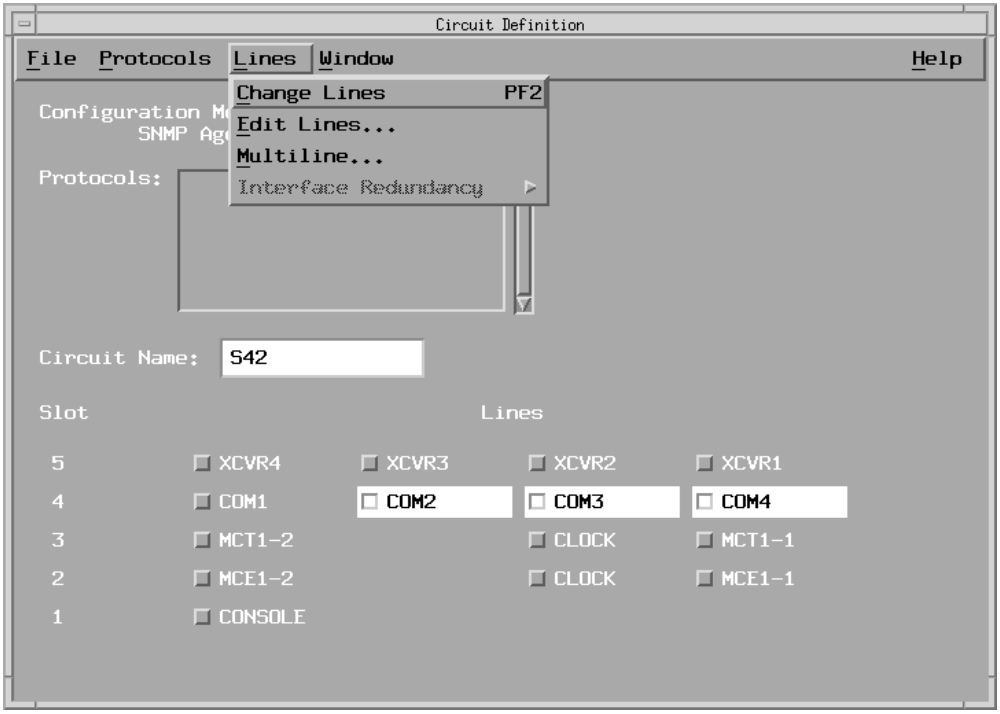

Figure 7-5. Change Lines Menu Option

The lines now form one circuit. The default traffic distribution method is address-based. If you want to change the traffic distribution method, go to "Changing the Traffic Distribution Method," later in this chapter.

6. **Select File > Exit to exit this window.**

Changing the Traffic Distribution Method

All multiline circuits, by default, distribute traffic using address pairs. To change the traffic distribution method:

1. **Start at the Configuration Manager window.**
2. **Click on one of the connectors in the appropriate multiline circuit.**

   The Edit Connector window appears.
3. **Click on Edit Circuit.**

   The Circuit Definition window appears (refer to Figure 7-5).
4. **Select Lines > Multiline.**

   The Edit Multiline Options window appears (Figure 7-6), displaying the circuit number in its title.

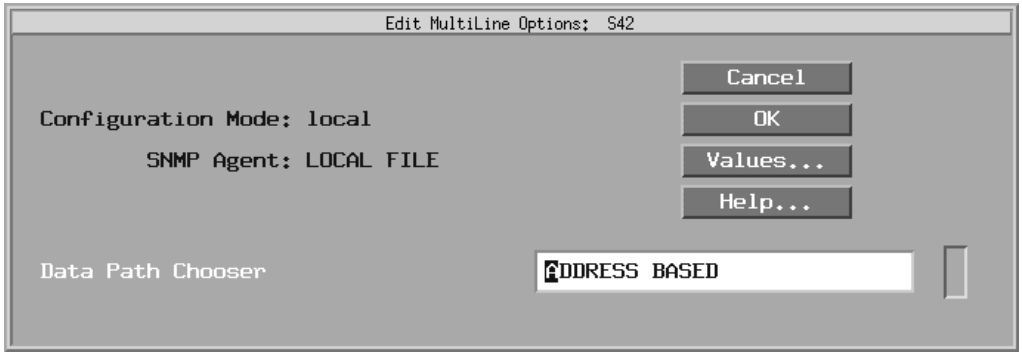

Figure 7-6. Edit Multiline Options Window

5. **Edit the Data Path Chooser parameter to select the data path.**

   See “Multiline Traffic Distribution” earlier in this chapter for information.

Site Manager: Data Path Chooser parameter: page A-74

Grouping Logical Lines into a Multiline Circuit

This section describes how to group multiple unused MCE1 or MCT1 logical lines into one multiline circuit. An unused logical line is one without a defined circuit.

You can group as many as 31 MCE1 logical lines and 24 MCT1 logical lines into one multiline circuit. All logical lines in a multiline group have the same circuit name. See Chapter 7 for detailed information about multiline services.

Before you can group the lines, you must create the unused logical lines. To create unused lines:

1. **Start at the MCE1 or MCT1 Logical Lines window (refer to Chapter 6).**
2. **Click on Add.**

   The Add Circuit window appears.
3. **Click on Cancel.**

   Clicking on OK adds a circuit for this line. Clicking on Cancel creates an unused logical line. The unused logical line will be the next available logical line, represented by a number from 1 to 31.

   The MCE1 Logical Lines window reappears.
4. **Repeat Steps 2 and 3 for each unused logical line that you want to create.**

   The MCE1 Logical Lines window now lists the unused logical lines. Figure 7-7 shows three unused logical lines.

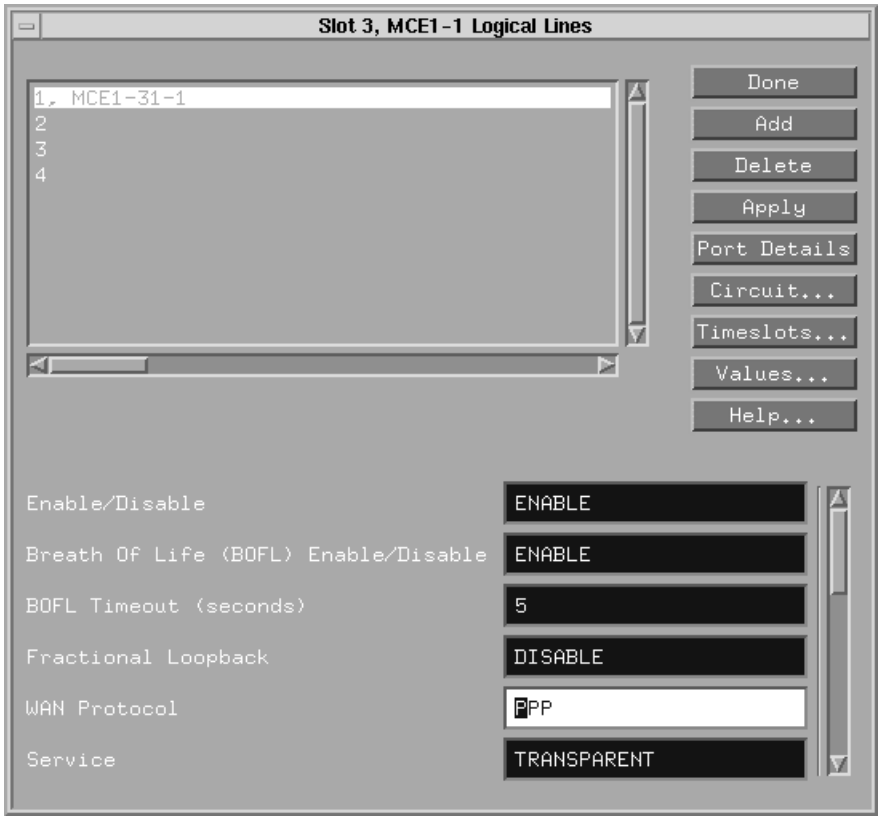

Figure 7-7. Logical Lines Window with Unused Logical Lines (MCE1 Example)

To group lines into a multiline group:

1. **Highlight the circuit that you want to include in a multiline group.**

   Figure 7-7 shows Logical Line 1 with circuit name MCE1-31-1 highlighted.

2. **Click on Circuit.**

   The Circuit Definition window appears (Figure 7-8).

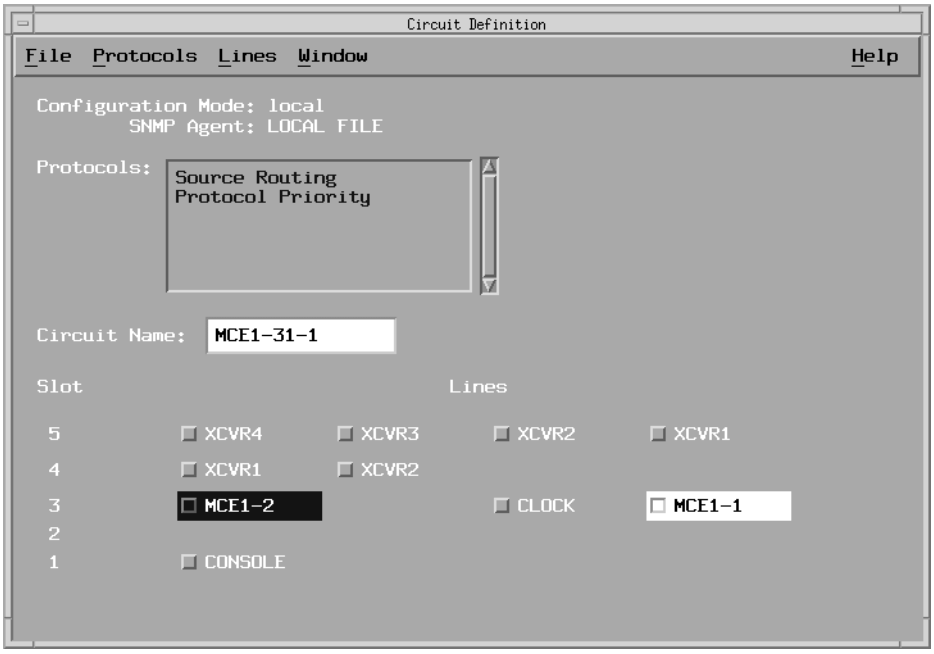

Figure 7-8. Circuit Definition Window

3. **Click on the connector that has the unused logical lines.**

   The Select Logical Line window appears (Figure 7-9), displaying the lowest-numbered unused logical line.

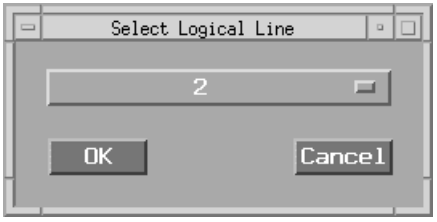

Figure 7-9. Select Logical Line Window

4. **Click on and hold down the logical line number (Figure 7-10).**

   The Select Logical Lines window displays any additional unused logical lines.

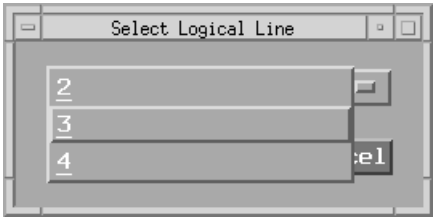

Figure 7-10. Selecting an Unused Logical Line

5. **Select a logical line that you want to include in the multiline circuit.**
6. **Click on OK.**

   The Circuit Definition window appears.
7. **Select Lines > Change Lines.**
8. **Select Lines > Change Lines again to see if the Multiline option is now available for this circuit (Figure 7-11).**
9. **Repeat Steps 3 through 7 for each unused logical line that you want to include in the multiline circuit.**

   These logical lines are now grouped as a circuit.

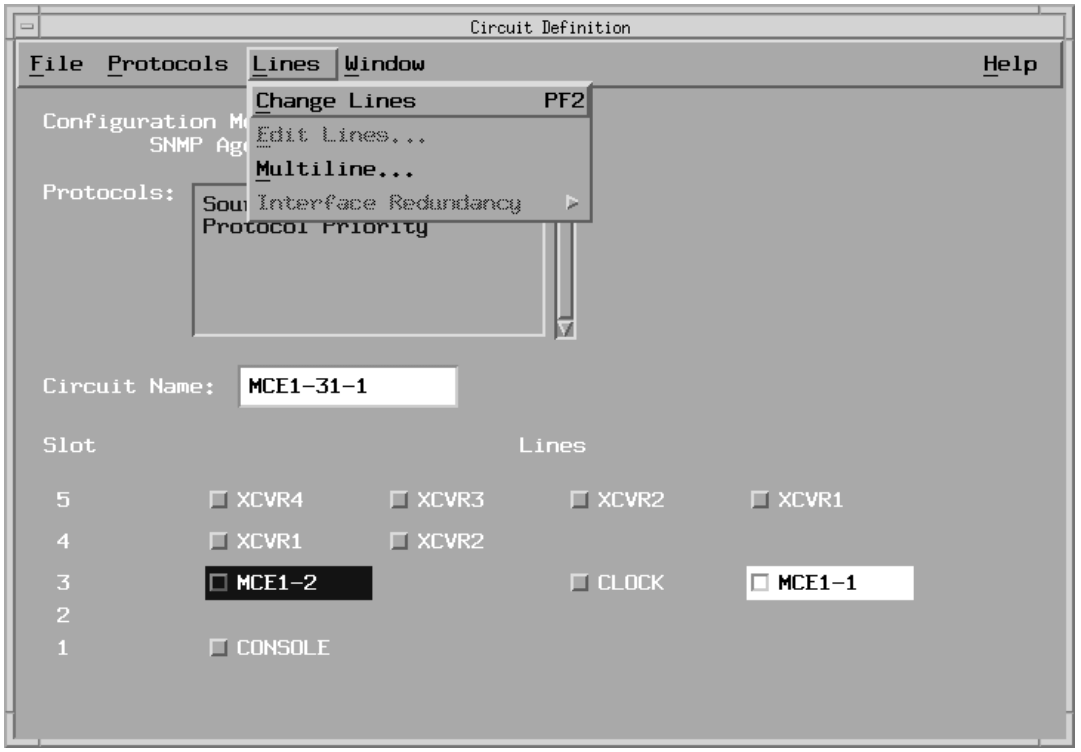

Figure 7-11. Multiline Option from the Circuit Definition Window

10. **Select File > Exit.**

    The MCE1 or MCT1 Logical Lines window appears, displaying a multiline group (Figure 7-12).

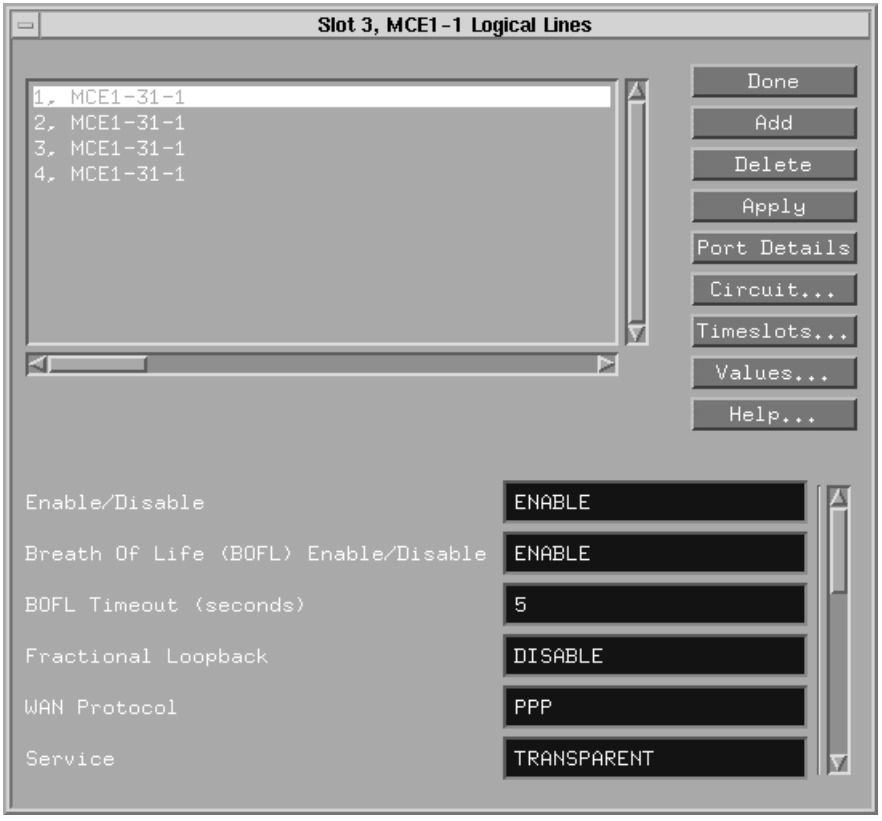

Figure 7-12. Example Logical Lines Window with a Multiline Circuit Defined

Note that all logical lines now have the same circuit name (MCE1-31-1, in the example).

Chapter 8
Managing Line Resources

The first part of this chapter provides an overview of line resource reservation for ST2 traffic on Bay Networks routers.

Later sections explain

- Starting the LRM
- Configuring the LRM
- Disabling Line Resource Management

Note: Before you can enable the LRM, you must first configure IP and the ST2 agent on a circuit. See *Configuring IP Multicasting Services.*

About Line Resource Management Services

Emerging realtime multicast applications for digitized voice and video (such as multimedia conferencing and virtual reality) require a level of consistent network service that routers cannot meet using simple first-in-first-out (FIFO) queuing mechanisms. The existing best-effort delivery service of IP networks, where variable queuing delays and data loss due to congestion are acceptable, is not sufficient.

Resource reservation protocols such as Stream Protocol 2 (ST2) address the requirements of delay-sensitive applications by distributing information among routers to achieve a guaranteed Quality of Service (QoS) for specific packet streams (flows).

The Line Resource Manager allows you to use guaranteed QoS to both meet the demands of realtime applications and maintain bandwidth for other traffic.

Line Resource Manager (LRM)

The Line Resource Manager (LRM) is part of the Bay Networks router Circuit Resource Manager (CRM) feature. LRM lets you define a certain percentage of a particular line's bandwidth as *reservable*. Applications that require a guaranteed QoS can negotiate for the reservable bandwidth. When the router honors a reservation request, the LRM allocates bandwidth from the reservable bandwidth, reducing the bandwidth available for other requests.

Supported Media

You can enable the LRM on 10-Mb/s Ethernet, MCT1, HSSI, and synchronous interfaces. LRM supports the following synchronous interface encapsulation methods:

- Point-to-Point Protocol (PPP)
- Bay Networks Standard
- Frame Relay
- ATM DXI

Note: You cannot use line resource management on a line you configured for PPP multilink.

How LRM Works with ST2

The following summarizes the exchange between the ST2 agent and the LRM.

1. The router receives an ST2 connect request.

   The ST2 connect request includes a flow specification (*flowspec*) that indicates the resources needed to meet the QoS.

2. ST2 passes the flowspec to the LRM.

3. The LRM compares the requested resources with available reservable bandwidth.

   LRM determines reservable bandwidth from configured values described later in this chapter. It also accounts for any active reserved flows.

4. The LRM either reserves the necessary services or refuses service.

Starting the LRM

To enable the LRM for reserving and allocating bandwidth:

1. **Start at the Configuration Manager window.**
2. **Click on the circuit connector.**

   Select any XCVR (10-Mb/s or 100-Mb/s Ethernet), HSSI, MCT1, or COM connector for a line that is configured for ST2.
3. **Unless you selected an MCT1 connector, go to Step 6.**

   The MCT1 Logical Lines window appears (Figure 8-1).

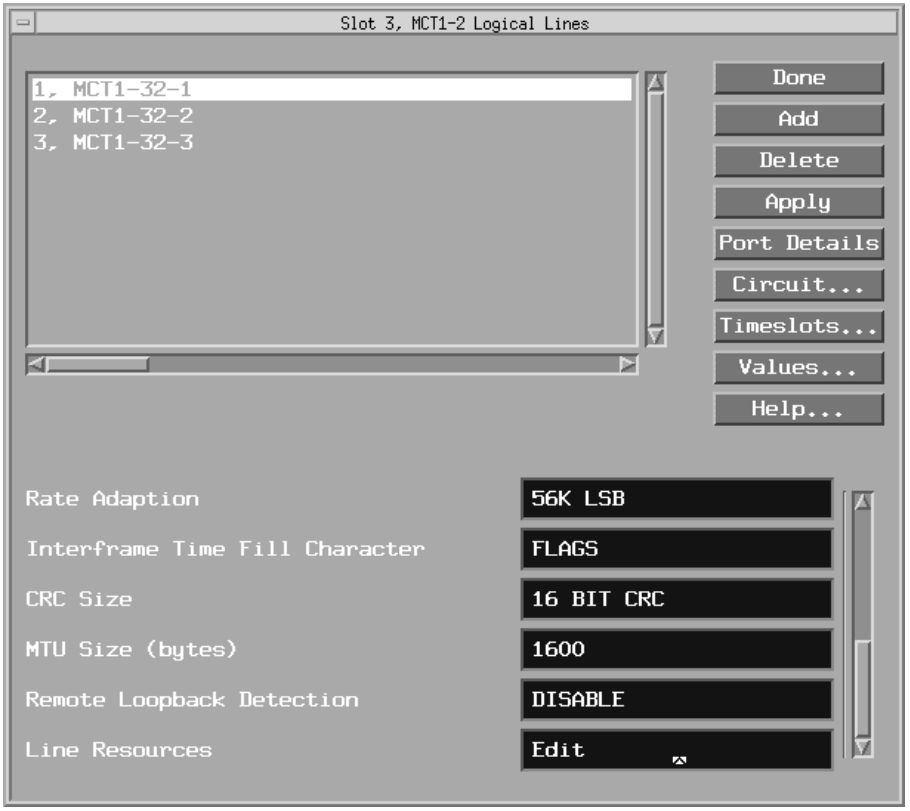

Figure 8-1. MCT1 Logical Lines Window

4. **Select the Line Resources box.**

5. **Click on Values.**
6. **Click on Edit Line Resources in the Edit Connector window (Figure 8-2).**

Figure 8-2. Edit Connector Window

The following Site Manager prompt appears (Figure 8-3):

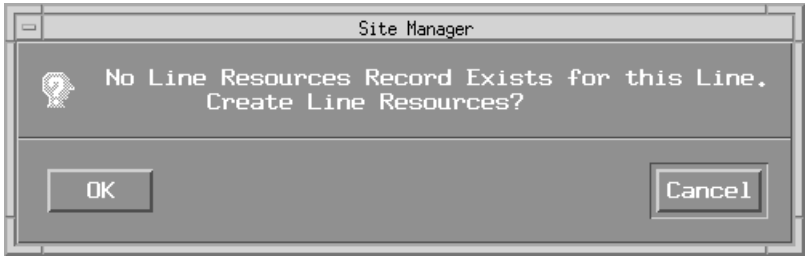

Figure 8-3. Creating the Line Resources Record

7. **Click on OK.**

The Edit Line Resources window appears (Figure 8-4).

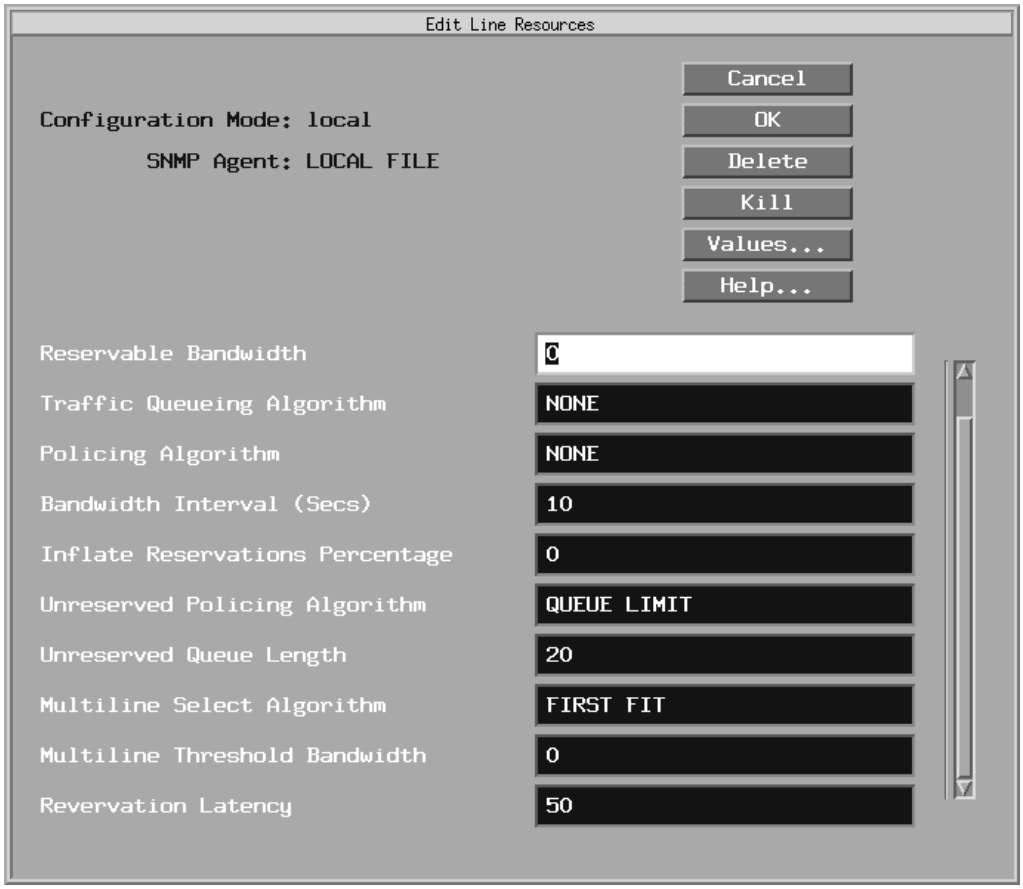

Figure 8-4. Edit Line Resources Window

Configuring the LRM

When you activate the LRM, you *must*

1. Specify an estimated bandwidth value greater than 0.
2. On a multiline circuit, edit the Multiline Select Algorithm and Multiline Threshold Bandwidth parameters.

You may also want to

1. **Modify or verify the default queuing of traffic for reserved bandwidth.**

   Specify the Traffic Queuing Algorithm, Policing Algorithm, Bandwidth Interval, and Inflate Reservations Percentage.

2. **Modify or verify the default queuing of traffic for unreserved bandwidth.**

   Specify the Unreserved Policing Algorithm and Unreserved Queue Length.

3. **Modify or verify the maximum latency for a reserved-flow packet.**

   Set the Reservation Latency.

See the applicable sections to configure LRM on an interface:

- Setting the Estimated Bandwidth
- Setting the Reservable Bandwidth
- Specifying the Traffic Queuing Algorithm
- Specifying the Policing Algorithm
- Setting the Bandwidth Interval
- Setting the Inflate Reservations Percentage
- Specifying the Unreserved Policing Algorithm
- Specifying the Unreserved Queue Length
- Specifying the Multiline Select Algorithm
- Setting the Multiline Threshold Bandwidth
- Setting the Reservation Latency

Setting the Estimated Bandwidth

To activate resource reservation, enter the portion of this line's bandwidth to make available for ST2 requests for guaranteed service.

Enter an estimated total bandwidth for this line, from 0 through 214748364 bits/s. To enable line resource management, enter a value greater than zero.

For point-to-point lines, you can usually enter the total line speed.

For an Ethernet line, you must estimate a value, because shared-media lines may not have all of the bandwidth available. Base the estimate on line statistics, the number of connected workstations, or other site-specific information.

You can set the Estimated Bandwidth for this interface.

Site Manager: Estimated Bandwidth parameter: page A-75

Setting the Reservable Bandwidth

To enable ST2 reservable resources, specify the portion of this line's bandwidth to make available for ST2 requests for guaranteed service. The value can be any value from 0 through 214748364 bits/s, and must be less than the value of the Estimated Bandwidth parameter.

Caution: Never make all available bandwidth reservable. Leave at least 15 percent of bandwidth available for network management, routing protocols, and other best-effort traffic.

You can set the Reservable Bandwidth for this interface.

Site Manager: Reservable Bandwidth parameter: page A-75

Specifying the Traffic Queuing Algorithm

By default, LRM uses best-effort scheduling for all reserved traffic. The resource reservation protocol (ST2) controls admission of flows to the network, but does not explicitly schedule each flow's packets.

You can select a priority queuing algorithm to schedule reserved traffic ahead of non-reserved traffic.

Set the Traffic Queuing Algorithm to None (best-effort scheduling for reserved traffic) or Priority (reserved traffic ahead of non-reserved) for this interface.

Site Manager: Traffic Queuing Algorithm parameter: page A-76

Specifying the Policing Algorithm

By default, LRM does not check ST2 packets against the flowspec (policing). This assumes that an upstream router is policing traffic, or the applications generating the reserved traffic consistently adhere to the flowspec and do not require policing.

When using the Leaky Bucket policing algorithm for reserved traffic, LRM makes sure that all ST2 packets using reserved bandwidth follow the flowspec that appears in the ST2 connect request. LRM discards any packets that do not adhere to the flowspec.

Note that Leaky Bucket policing requires additional processing by the router.

You can set the Policing Algorithm for this interface.

Site Manager: Policing Algorithm parameter: page A-76

Setting the Bandwidth Interval

By default, LRM measures instantaneous bandwidth over a 10 second interval. If 10 seconds is not sufficient, you can specify a different bandwidth interval for this interface, from 1 through 214748364 seconds.

Site Manager: Bandwidth Interval (Secs) parameter: page A-77

Setting the Inflate Reservations Percentage

By default, LRM does not add a safety buffer to each ST2 reservation on a line. To inflate reservations made on this line, enter a percent value to increase each bandwidth request.

Increase the value of this parameter if you notice that the LRM is discarding packets because applications generating reserved traffic are exceeding their flowspecs.

Site Manager: Inflate Reservations Percentage parameter: page A-77

Specifying the Unreserved Policing Algorithm

LRM uses one of two policing algorithms for unreserved traffic.

- *Queue Limit* -- Restricts the number of buffers (packets) of unreserved traffic that LRM queues.

  This method of policing enables unreserved traffic to use available reserved bandwidth. Set the Unreserved Queue Length parameter to specify the maximum number of packets in the queue.

Note: If you enable priority queuing for this line, the router uses the priority queue parameters to perform Queue Limit policing. See *Configuring Traffic Filters and Protocol Prioritization* for information about priority queue parameters.

- *Leaky Bucket* -- Causes the router to actively police the unreserved traffic based on the unreserved bandwidth.

  This method does not allow unreserved traffic to take advantage of available reserved bandwidth.

You can set the Unreserved Policing Algorithm for this interface.

Site Manager: Unreserved Policing Algorithm parameter: page A-78

Specifying the Unreserved Queue Length

If the Unreserved Policing Algorithm parameter is set to Queue Limit, you can specify the maximum number of unreserved (best-effort) packets to be held in queue for transmission. After the queue length reaches this value, the router discards best-effort traffic when congestion occurs.

Note that Priority queuing limits, if configured, override the value of this parameter.

By default, LRM holds a maximum of 20 unreserved packets in queue for transmission. Change this value to adjust the queue length limit, a value from 0 through 214748364 packets (limited by available buffers).

Site Manager: Unreserved Queue Length parameter: page A-78

Specifying the Multiline Select Algorithm

If you configured LRM on a multiline circuit, you can choose one of two algorithms that determine how LRM selects which line to use for a new resource request.

- *First Fit* -- Always uses the first available line that can service reserved traffic requests
- *Round Robin* -- Rotates the use of lines available to service requests

All lines for a circuit must use the same algorithm. If any one line on a circuit specifies First Fit, all lines use the first-fit algorithm..

Site Manager: Multiline Select Algorithm parameter: page A-79

Setting the Multiline Threshold Bandwidth

When using the First Fit Multiline Select Algorithm (see the“Specifying the Multiline Select Algorithm” section), you can configure a threshold of 0 through 214748364 bits/s for the first available line.

By default, the threshold is set to 0; LRM uses the simple first-fit algorithm. If you select a value greater than 0, LRM still uses the first available line with reservable bandwidth to service requests, but moves to the next available line after reaching the configured threshold. When all lines are at their threshold, LRM returns to using the simple first-fit algorithm.

Set this parameter only if you have configured LRM on a multiline circuit and have set the Multiline Select Algorithm parameter to First Fit.

Site Manager: Multiline Threshold Bandwidth parameter: page A-79

Setting the Reservation Latency

By default, the maximum lateency for a reserved flow packet is 50 milliseconds, limiting the amount of unreserved data that the link scheduler can transmit. When the data transmit ring reaches a size where the time to transmit the data is greater than the value of this parameter, no more unreserved data will be queued.

You can set the reservation latency from 0 through 214748364 milliseconds. Reduce the value of this parameter to obtain better delay characteristics for reserved flows, but note that overall throughput may decrease. Increase the default value to improve throughput, but note that reserved-flow delays may increase.

Site Manager: Reservation Latency parameter: page A-80

Disabling Line Resource Management

You can use the Configuration Manager to remove a line's resource reservation services or to delete the line resource record and completely disable LRM on a line.

Removing a Line's Reservations

To remove all outstanding reservations for a particular line:

1. **Start at the Configuration Manager window.**
2. **Click on the appropriate circuit connector.**

   The Edit Connector window appears (refer to Figure 8-2).
3. **Click on Edit Line Resources.**

   The Edit Line Resources window appears (refer to Figure 8-4).
4. **Click on Kill.**

   Site Manager displays the following message (Figure 8-5):

Figure 8-5. Removing a Line's Reserved Resources

5. **Click on OK.**

Deleting LRM Services

To delete the line resource record and completely disable LRM on a circuit:

1. **Start at the Configuration Manager window.**
2. **Click on the appropriate circuit connector.**

   The Edit Connector window appears (refer to Figure 8-2).
3. **Click on Edit Line Resources.**

   The Edit Line Resources window appears (refer to Figure 8-4).
4. **Click on Delete.**

   Site Manager displays the following message (Figure 8-6):

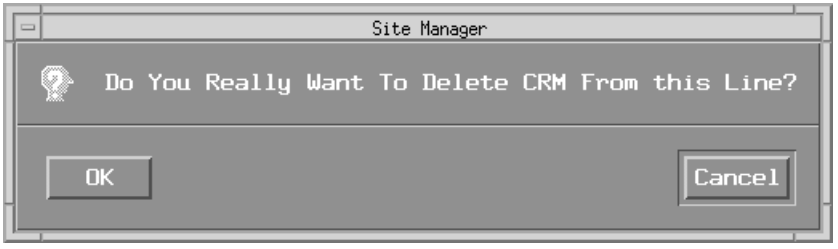

Figure 8-6. Deleting the CRM Line Resource Record

5. **Click on OK.**

   The Configuration Manager window appears.

The next time you select Edit Line Resources for this line in the Edit Connector window (refer to Figure 8-2), Site Manager will prompt you to re-create the line resource record. You can reconfigure resource reservation by completing the steps in "Starting the LRM," earlier in this chapter.

Appendix A
Site Manager Line Services Parameters

This appendix contains reference information on Site Manager Line Service parameters in the following sections:

- Editing LAN Line Services
- Editing WAN Line Services
- Editing Multiline Configuration Parameters
- Editing Line Resource Reservation Parameters

For each line parameter associated with a physical layer protocol, this appendix provides the Site Manager menu path to each parameter, information about default settings, valid parameter options, the parameter function, instructions for setting the parameter, and the MIB object ID.

Note: The Site Manager menu path to each parameter listed in this appendix begins at the Configuration Manager screen.

Editing LAN Line Services

Read the parameter descriptions in this section when editing

- CSMA/CD Line Parameters
- FDDI Line Parameters
- Token Ring Line Parameters

CSMA/CD Line Parameters

You access the CSMA/CD Line Parameters for an Ethernet/802.3 LAN interface from the Configuration Manager.

Parameter: Enable

Path: **XCVR** Connector > **Edit Line** > Edit CSMA/CD Parameters
Default: Enable
Options: Enable | Disable
Function: Enables or disables this Ethernet line.
Instructions: Select Enable or Disable.
MIB Object ID: 1.3.6.1.4.1.18.3.4.1.1.2

Parameter: BofL Enable

Path: **XCVR** Connector > **Edit Line** > Edit CSMA/CD Parameters
Default: Enable
Range: Enable | Disable
Function: When set to Enable, the router sends Breath of Life polling messages from this system to all systems on the local network.
Instructions: Set to Enable or Disable. We recommend that you enable BofL.
MIB Object ID: 1.3.6.1.4.1.18.3.4.1.1.7

Parameter: BofL Timeout

Path: **XCVR** Connector > **Edit Line** > Edit CSMA/CD Parameters
Default: 5 seconds
Range: 1 to 60 seconds
Function: Specifies the time between transmissions of Breath of Life messages from this Ethernet interface. Timeout will occur if five periods elapse without a successful BofL message transmission. When timeout occurs, the router disables and re-enables the Ethernet interface.

This parameter is valid only if you set BofL Enable to Enable.

Instructions: Accept the default BofL timeout of 5 seconds, or specify a new value up to 60 seconds.
MIB Object ID: 1.3.6.1.4.1.18.3.4.1.1.8

Parameter: **Hardware Filter**

Path: **XCVR** Connector (10Base-T only) > **Edit Line** > Edit CSMA/CD Parameters

Default: Disable (the default changes to Enable when you add a circuit and reply OK to the prompt `Do you want to enable Hardware Filters on this circuit?`)

Range: Enable | Disable

Function: Enables filtering hardware in the link or net module to drop local frames at the interface instead of copying them into system memory. Enabling hardware filters improves bridging software performance because router resources are not used to receive and reject local frames.

Instructions: Set to Enable only if you enabled the bridge software and the link or net module has hardware filters.

MIB Object ID: 1.3.6.1.4.1.18.3.4.1.1.29

Parameter: **Interface Line Speed**

Path: **XCVR** Connector (100Base-T only) > **Edit Line** > Edit CSMA/CD Parameters

Default: 100BASE-TX / 100BASE-FX

Range: AUTO NEGOTIATION | 100BASE-TX / 100BASE-FX | 100BASE FD (Full Duplex) | 100BASE FD w/ Cong Control

Function: Specifies the configured line speed and duplex setting for the selected interface, or enables automatic line negotiation.

Instructions: To enable automatic line negotiation, select AUTO NEGOTIATION. Note that full-duplex support negotiated automatically is without congestion control.

To configure a specific line speed, select one of the following:

- 100BASE-TX / 100BASE-FX (half-duplex over either twisted-pair or fiber cabling)
- 100BASE FD (full-duplex without congestion control)
- 100BASE FD w/ Cong Control (full-duplex with congestion control).

Selecting a specific line-speed configuration disables AUTO NEGOTIATION.

MIB Object ID: 1.3.6.1.4.1.18.3.4.16.1.1.4

Parameter: **Line Advertising Capabilities**

Path: **XCVR** Connector (100Base-T only) > **Edit Line** > Edit CSMA/CD Parameters > Interface Line Speed parameter = AUTO NEGOTIATION > **OK** > **Configure Line Capabilities** > Line Advertising Capabilities

Default: 11

Range: 00 | 01 | 10 | 11

Function: Specifies the line configurations available to remote nodes that have automatic line negotiation capability.

Instructions: Select the code for the desired line advertising:

- 100BASE-TX, half-duplex only = 10
- 100BASE-TX, full-duplex only = 01
- 100BASE-TX, both half- and full-duplex = 11
- No advertising = 00

MIB Object ID: 1.3.6.1.4.1.18.3.4.16.1.1.9

FDDI Line Parameters

You access the FDDI Line Parameters for an FDDI interface from the Configuration Manager.

Parameter: **Enable**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: Enable

Options: Enable | Disable

Function: Enables or disables the FDDI circuit for the selected connector.

Instructions: Set to Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.2

Parameter: **BofL Enable**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: Enable

Range: Enable | Disable

Function: Enables or disables BofL polling.

When you set both this parameter and the LLC Data Enable parameter to Enable, the router disables the LLC interface after the time you specify using the BofL Timeout parameter if the link becomes unavailable.

When you set this parameter to Disable, the router disables the LLC interface immediately after the link becomes unavailable.

Instructions: Set to Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.7

Parameter: **BofL Timeout**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: 3 seconds

Options: 0 to 3600 seconds

Function: When BofL is enabled and the link becomes unavailable, this parameter specifies the time Site Manager waits before disabling the LLC interface.

Instructions: Accept the default value, 3 seconds, or specify a new value. Be sure to set the BofL Enable parameter to Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.8

Parameter: **Connection Policy**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: 0xff65

Options: 0x0 to 0xffff

Function: Specifies the connection policies this line requests at the FDDI station.

The policy descriptor takes the form “rejectX-Y” where X denotes the physical connection (PC) type of the local port, and Y denotes the PC type of the neighbor port. X and Y can have the following values:

- A - Indicates that the port is a dual-attachment station or concentrator that attaches to the primary IN and the secondary OUT when attaching to the dual FDDI ring
- B - Indicates that the port is a dual-attachment station or concentrator that attaches to the secondary IN and the primary OUT when attaching to the dual FDDI ring
- S - Indicates a port in a single-attachment station or concentrator
- M - Indicates a port in a concentrator that serves as a master to a connected station or concentrator

Instructions: Specify the status word value that represents the connection policies you want this line to reject. Start with a value of zero for the status word (all bits set to 0). For each connection policy you want the node to reject, add to the status word value the number 2 raised to a power specified in Table 3-2 (Chapter 3). This is equivalent to setting a bit to 1 for each policy that you want the node to reject.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.30

Parameter: **T_Notify Timeout**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: 22 seconds

Options: 2 to 30 seconds

Function: Specifies the interval between successful iterations of the Neighbor Notification Protocol.

Instructions: Accept the default value of 22 seconds or specify a new value from 2 to 30 seconds.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.31

Parameter: **Hardware Filter**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: Disable (the default changes to Enable when you add a circuit and reply OK to the prompt `Do you want to enable Hardware Filters on this circuit?`)

Options: Enable | Disable

Function: When you set this parameter to Enable, the link module filtering hardware, if present, does not allow the router to copy local frames into memory. In essence, the filtering hardware drops local frames at the interface. Hardware filtering improves performance because the bridging software no longer uses resources to receive and reject those frames.

Instructions: Set to Enable only if you enabled the bridge and the link module has hardware filters.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.37

Parameter: **User Data**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: None

Options: Any string containing up to 32 alphanumeric characters

Function: Allows you to enter additional information about the router. This information is attached to the status information frames (SIFs).

Instructions: Enter up to 32 alphanumeric characters.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.1.3.1.8

Parameter: **Status Report Protocol**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: Enable

Options: Enable | Disable

Function: Specifies whether the node will generate Status Report Frames (SRFs) for its implemented events (for example, high bit errors, topology changes, trace status events, MAC frame error condition, port LER condition, and MAC duplicate address condition).

Instructions: Accept the default, Enable, if you want the node to generate SRFs; specify Disable if you do not want the node to generate SRFs. We recommend using Enable to ensure that your FDDI network is ANSI-compliant.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.1.3.1.14

Parameter: **Trace Max Expiration (ms)**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: 7000 milliseconds (7 seconds)

Options: 6001 to 256000 milliseconds

Function: Specifies the maximum propagation time for a trace on an FDDI topology.

Instructions: Enter a value from 6001 to 256000. We recommend accepting the default value of 7000 milliseconds.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.1.3.1.15

Parameter: **Duplicate Address Protocol**

Path: **FDDI** Connector > **Edit Line**e > Edit FDDI Parameters

Default: Enable

Options: Enable | Disable

Function: Implements an optional ANSI duplicate address test involving periodic transmission of Network Service Address Network Interface Function (NSA NIF) frames to the source.

Instructions: Accept the default, Enable, if you want to test for duplicate addresses. Specify Disable if you do not want to test for duplicate addresses.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.1.3.1.18

FDDI MAC Attribute Parameters

Parameter: LLC Data Enable

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **MAC Attributes** > FDDI MAC Attributes

Default: Enable

Options: Enable | Disable

Function: Specifies whether the MAC is available to transmit and receive Logical Link Control (LLC) Protocol Data Units (PDUs). If you accept Enable, the interface to the MAC entity is available to exchange PDUs between the MAC and the local LLC entity when the ring becomes operational. Setting this attribute does not affect transferring and receiving MAC or SMT frame types.

Instructions: Accept the default, Enable, if you want the MAC available for transmitting and receiving LLC PDUs; specify Disable if you do not want the MAC available for transmitting and receiving LLC PDUs.

MIB Object ID: 13.6.1.4.1.18.3.4.15.2.3.1.17

FDDI Path Attribute Parameters

Parameter: Tvx Lower Bound (ms)

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Path Attributes** > FDDI Path Attributes

Default: 2.5 milliseconds (ms)

Options: The value must be greater than zero and less than the value of Requested TTRT. If the value of Requested TTRT is greater than 5.2 ms, set this parameter to a value less than or equal to 5.2 ms. For example, if the value of Requested TTRT is 165 ms, the value for Tvx Lower Bound must be less than or equal to 5.2 ms.

Function: Specifies the minimum time value of the Valid Transmission Timer (TVX).

Instructions: Accept the default value of 2.5 milliseconds or specify a new value less than or equal to 5.2 milliseconds and less than the value of Requested TTRT.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.3.3.1.5

Parameter: **T_Max Lower Bound (ms)**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Path Attributes** > FDDI Path Attributes

Default: 165 milliseconds (ms)

Options: 10 to 1336.9344 ms

Function: Allows you to specify the maximum time value of TTRT. The value must be greater than or equal to 10 ms, greater than or equal to the value of the Requested TTRT (ms) parameter, and less than or equal to 1336.9344 ms.

Instructions: Accept the default value of 165 ms, or specify a new value less than or equal to 1336.9344 ms and greater than or equal to the value of the Requested TTRT (ms) parameter.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.3.3.1.6

Parameter: **Requested TTRT (ms)**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Path Attributes** > FDDI Path Attributes

Default: 165 milliseconds (ms)

Options: Variable. This value must be greater than the value specified for the TVX Lower Bound (ms) parameter and less than or equal to the value specified for the T_Max Lower Bound (ms) parameter.

Function: Specifies the target token rotation time carried in claim frames issued by the FDDI station.

Instructions: Accept the default of 165 ms or enter a new value in milliseconds.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.32

FDDI Port Attribute Parameters

Parameter: **LER Cutoff**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Port Attributes** > FDDI Port Attributes

Default: 7

Options: 4 to 15

Function: Specifies the link error rate estimate at which a link connection is broken. It ranges from 10^{-4} to 10^{-15} and is reported as the absolute value of the base 10 logarithm.

Instructions: Accept the default value of 7 or specify a new value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.4.3.1.17

Parameter: **LER Alarm**

Path: **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Port Attributes** > FDDI Port Attributes

Default: 8

Options: 4 to 15

Function: Specifies the link error rate estimate at which a link connection generates an alarm. It ranges from 10^{-4} to 10^{-15} and is reported as the absolute value of the base 10 logarithm of the estimate.

Instructions: Accept the default value of 8 or specify a new value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.4.3.1.18

Token Ring Line Parameters

You access the Token Ring Line Parameters for an Token Ring interface from the Configuration Manager.

Parameter: Enable

Path: **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters
Default: Enable
Options: Enable | Disable
Function: Enables or disables the Token Ring circuit.
Instructions: Set to Disable if you want to disable the Token Ring circuit.
MIB Object ID: 1.3.6.1.4.1.18.3.4.2.1.2

Parameter: MAC Address Override

Path: **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters
Default: None
Options: Any valid, 48-bit MAC-level address
Function: Assigns a user-specified MAC address.
Instructions: If you want the router to generate the MAC address for this Token Ring interface, ignore this parameter.

If you want to specify a MAC address (for example, to avoid host number conflicts on a directly connected IPX or XNS network), enter the 48-bit MAC address in MSB format; that is, enter 0x followed by 12 hexadecimal digits.

If you enter a MAC address with this parameter, you must set the MAC Address Select parameter to CNFG.

MIB Object ID: 1.3.6.1.4.1.18.3.4.2.1.9

Parameter: **MAC Address Select**

Path: **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters

Default: PROM

Options: BOXWIDE | PROM | CNFG

Function: Determines the source of the MAC address.

Instructions: Enter BOXWIDE if you want the Token Ring interface to use a MAC address that the software generates from the router's serial number.

Enter PROM if you want the Token Ring interface to use a MAC address from programmable read-only memory on the Token Ring link module.

Enter CNFG if you explicitly assigned a MAC address with the MAC Address Override parameter.

MIB Object ID: 1.3.6.1.4.1.18.3.4.2.1.10

Parameter: **Speed**

Path: **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters

Default: 16 Mb/s

Options: 16 Mb/s | 4 Mb/s

Function: Specifies the speed of the Token Ring media. If you select 16 Mb/s, the router enables the Early Token Release protocol, which is used extensively on 16-Mb/s media. In the unlikely event that you want to disable Early Token Release over 16-Mb/s Token Ring media, you can do so with the Early Token Release parameter.

Instructions: Enter the ring speed.

MIB Object ID: 1.3.6.1.4.1.18.3.4.2.1.11

Parameter: **Early Token Release**

Path: **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters

Default: Enable

Options: Enable | Disable

Function: Indicates whether the token can return to the ring before the recipient copies all data. This parameter is valid only when you set the Speed parameter to 16 Mb/s.

Instructions: Accept the current value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.2.1.12

Editing WAN Line Services

Use the parameter descriptions in this section for editing

- Asynchronous Line Parameters
- ATM ARE Line Parameters
- ATM FRE-2 Line Parameters
- E1 Line Parameters
- HSSI Line Parameters
- LAPB Parameters
- MCE1 and MCT1 Logical Line Parameters
- MCE1 Port Parameters
- MCT1 Port Parameters
- Synchronous Line Parameters
- T1 Line Parameters

Asynchronous Line Parameters

On a Bay Networks AN or ASN router only, the Configuration Manager displays the Edit ASYNC Parameters window when you select the ASYNC protocol from the WAN Protocols window for a COM2 port line. Use the window's scroll bar to view all of the asynchronous line parameters.

Parameter: Enable

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters
Default: Enable
Options: Enable | Disable
Function: Enables or disables ASYNC on the router.
Instructions: Set this parameter to either globally enable or disable ASYNC.
MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.2

Parameter: **MTU**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters

Default: 1000 bytes

Options: 3 to 1580 bytes

Function: Specifies the largest frame (Maximum Transmission Unit) that the router can transmit via the Transmission Control Protocol (TCP).

Instructions: Specify a value in the range 3 to 1580.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.7

Parameter: **Start Protocol**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters

Default: Answer

Options: Loop | Originate | Answer

Function: Specifies the start mode for the ASYNC TCP connection.

Instructions: Select Answer to advise local TCP to wait for a connection request.

Select Originate to advise local TCP to initialize a connection to the specified remote IP address.

Select Loop to perform asynchronous cable testing.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.9

Parameter: **Remote IP Addr**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters

Default: None

Options: Any valid 32-bit IP address in dotted decimal notation

Function: Specifies a remote TCP host to which this router will communicate using ASYNC. The remote IP address is used only when the Start Protocol parameter is set to Originate.

Instructions: Enter a valid IP address in dotted decimal notation.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.26

Parameter: **Remote Port**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters

Default: 7

Options: 1 to 65535

Function: Specifies a remote port for the TCP connection for asynchronous communications.

Instructions: Enter a remote port number. The remote port number is used only when the Start Protocol parameter is set to Originate.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.27

Parameter: **Local Port**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters

Default: 2100

Options: 1 to 65535

Function: Specifies a local port on the router for the TCP connection for asynchronous communications.

Instructions: Enter a local port number. The local port number is used only when the Start Protocol parameter is set to Answer.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.28

Parameter: **Baud Rate**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters

Default: 9600

Options: 300 | 1200 | 2400 | 4800 | 9600 | 19200

Function: Specifies the asynchronous line speed.

Instructions: Select the appropriate line speed for this configuration.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.29

Parameter: **Idle Timer**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters
Default: 20 seconds
Options: 1 to 300 seconds
Function: Specifies the asynchronous idle timer in seconds.
Instructions: Enter an appropriate idle timer value in seconds.
MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.30

Parameter: **Receive Window**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters
Default: 4096 bytes
Options: 512 to 65535 bytes
Function: Specifies the size of the TCP receive window for received asynchronous packets.
Instructions: Enter a value in the range 512 to 65535.
MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.31

Parameter: **TCP KeepAlive**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters
Default: 8 seconds
Options: 3 to 180 seconds
Function: Specifies how often the local TCP sends keepalive messages to the remote TCP.

When the local TCP sends out a TCP keepalive message, it expects an acknowledgment (ACK) from the remote TCP. The ACK then resets the inactive limit timer. If the local TCP does not receive the ACK from the remote TCP within the time limit specified by the TCP Inactive Limit parameter, the TCP connection is disabled. To prevent an error or alarm condition, set the TCP Inactive Limit parameter to a value that allows enough time for multiple TCP keepalive messages.

Instructions: Specify a value in the range 3 to 180 seconds.
MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.35

Parameter: **TCP Inactive Limit**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters

Default: 300 seconds

Options: -65536 to 65535 seconds

Function: Specifies the maximum inactivity timer in seconds. When the inactive limit timer expires, the TCP connection between the router and the remote TCP host is lost. This parameter works with the TCP KeepAlive parameter.

To prevent a TCP connection loss, set this parameter to a value that allows enough time for multiple TCP keepalive messages and ACKs from the remote TCP host. Refer to the TCP KeepAlive parameter for information. If the port is listening (TCP KeepAlive) for an incoming connection, you can specify a negative value for this parameter to mark the connection as inactive and defer resetting the connection until a connection request is received.

Instructions: Enter a value in the range -65536 to 65535 or accept the default value (300).

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.36

Parameter: **Cfg TxQ Length**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters

Default: None

Options: 1 to 255 bytes

Function: Specifies the maximum transmit queue length in bytes. This parameter reduces the size of the driver transmit queue if the transmit queue is larger than the value of this parameter.

Instructions: Enter a value in the range 1 to 255.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.37

Parameter: **Cfg RxQ Length**

Path: **COM** Connector > **Edit Line** > Edit Asynchronous Parameters

Default: None

Options: 1 to 255 bytes

Function: Specifies the maximum receive queue length in bytes. This parameter reduces the size of the driver receive queue if the receive queue is larger than the value of this parameter.

Instructions: Enter a value in the range 1 to 255.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.38

ATM ARE Line Parameters

You access the ATM ARE Line Parameters from the Configuration Manager.

Parameter: **Enable**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: Enable

Options: Enable | Disable

Function: Enables or disables the ATM ARE line driver.

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.2

Parameter: **Interface MTU**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: 4608 octets

Options: 1 to 9188 octets

Function: Specifies the largest packet size that the router can transmit on this interface.

Instructions: Enter a value that is appropriate for the network.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.9

Parameter: **Data Path Enable**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: Enable

Options: Enable | Disable

Function: Specifies whether or not the router disables the interface between the driver and the higher-level software (the data path interface) if you disconnect the cable from the ATM module

If you select Enable, when you disconnect the cable from the ATM, the router disables the data path interface after the time you specify with the Data Path Notify Timeout parameter.

If you select Disable, the router does not disable the data path interface when you disconnect the cable from the ATM module.

Instructions: Select Enable or Disable. If you select Enable, be sure to enter an appropriate value for the Data Path Notify Timeout parameter.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.11

Parameter: **Data Path Notify Timeout**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: 1 second

Options: 0 to 3600 seconds

Function: Defines the time the router waits before disabling the data path interface when you disconnect the cable from the ATM module, providing that you set the Data Path Enable parameter to Enable.

Instructions: Accept the default or enter an appropriate time value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.12

Parameter: **SVC Inactivity Timeout Enable**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: Enable

Options: Enable | Disable

Function: If you select Enable, the router disables any SVC on which the router receives or transmits no cells for the number of seconds you specify using the SVC Inactivity Timeout (Secs) parameter.

If you select Disable, the router keeps SVCs open unless you close them by another method.

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.13

Parameter: **SVC Inactivity Timeout (Secs)**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: 1200 seconds

Options: 60 to 3600 seconds

Function: If the router receives or transmits no cells on an SVC for this number of seconds, it closes the SVC, providing that you set the SVC Inactivity Timeout Enable parameter to Enable.

Instructions: Enter an appropriate time, and be sure to set the SVC Inactivity Timeout Enable parameter to Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.14

Parameter: **Framing Mode**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: Depends on ATM link module.

Options: SDH | SONET | CBIT | M23 | G751 | G832

Function: Specifies the transceiver mode for the physical interface.

Instructions: Select a transceiver mode as follows:

- SDH or SONET for OC-3 modules
- CBIT or M23 for DS3 modules
- G751 or G832 for E3 modules

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.17

Parameter: **Clocking Signal Source**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: Internal

Options: Internal | External

Function: Specifies whether the router uses its internal clock or an external clock for time signals on this interface.

Instructions: Select Internal to use the router's clock; select External to use an external clock.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.18

Parameter: **DS3 Line Build Out**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: Short

Options: Short | Long

Function: Conditions router signals to mitigate attenuation, which depends on the physical length of the line.

You can set this parameter only when using DS3 modules.

Instructions: Select Short for lines shorter than 225 ft; select Long for lines 225 ft or longer.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.23

Parameter: **DS3/E3 Scrambling**

Path: **ATM** Connector > **Line Attributes** > ATM ARE Line Driver Attributes

Default: On

Options: On | Off

Function: If you select On, the router randomizes cell payload sufficiently to guarantee cell synchronization. If you select Off, cell synchronization problems may result.

Note that ATM devices with different scrambling settings cannot communicate. For example, if you configure a router to enable scrambling, and configure a hub to disable scrambling, the router and hub cannot communicate.

You can set this parameter only when using DS3 and E3 modules.

Instructions: Select On or Off. If you select On, be sure to enable scrambling for all devices on the network. If you select Off, be sure to disable scrambling for all devices on the network.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.22

ATM FRE-2 Line Parameters

You access the ATM FRE-2 Line Parameters from the Configuration Manager.

Parameter: **Enable**

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters

Default: Enable

Options: Enable | Disable

Function: Enables or disables the ATM ARE line driver.

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.2

Parameter: **Interface MTU**

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters

Default: 4608 octets

Options: 1 to 9188 octets

Function: Specifies the largest packet size that the router can transmit on this interface.

Instructions: Enter a value that is appropriate for the network.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.2.1.1.2

Parameter: **Data Path Enable**

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters

Default: Enable

Options: Enable | Disable

Function: Specifies whether or not the router disables the interface between the driver and the higher-level software (the data path interface) if you disconnect the cable from the ATM module.

If you select Enable, when you disconnect the cable from the ATM, the router disables the data path interface after the time you specify with the Data Path Notify Timeout parameter.

If you select Disable, the router does not disable the data path interface when you disconnect the cable from the ATM module.

Instructions: Select Enable or Disable. If you select Enable, be sure to enter an appropriate value for the Data Path Notify Timeout parameter.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.2.1.1.14

Parameter: **Data Path Notify Timeout**

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters

Default: 1 second

Options: 0 to 3600 seconds

Function: Defines the time the router waits before disabling the data path interface when you disconnect the cable from the ATM module, providing that you set the Data Path Enable parameter to Enable.

Instructions: Accept the default or enter an appropriate time value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.2.1.1.15

Parameter: **SVC Inactivity Timeout Enable**

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters

Default: Enable

Options: Enable | Disable

Function: If you select Enable, the router disables any SVC on which the router receives or transmits no cells for the number of seconds you specify using the SVC Inactivity Timeout (Secs) parameter.

If you select Disable, the router keeps SVCs open unless you close them by another method.

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.13

Parameter: **SVC Inactivity Timeout (Secs)**

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters

Default: 1200 seconds

Options: 60 to 3600 seconds

Function: If the router receives or transmits no cells on an SVC for this number of seconds, it closes the SVC, providing that you set the SVC Inactivity Timeout Enable parameter to Enable.

Instructions: Enter an appropriate time, and be sure to set the SVC Inactivity Timeout Enable parameter to Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.3.2.1.14

Parameter: **Framing Mode**

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters > **Physical** > Physical Interface Attributes

Default: SONET

Options: SDH | SONET

Function: Specifies the framing mode.

Instructions: Select SDH or SONET, based on your network.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.2.11.1.4

Parameter: Scrambling

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters > **Physical** > Physical Interface Attributes

Default: Enable

Options: Enable | Disable

Function: Enabling scrambling randomizes cell payload sufficiently to guarantee cell synchronization. If you select Disable, cell synchronization problems may result.

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.2.11.1.5

Parameter: Loopback

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters > **Physical** > Physical Interface Attributes

Default: Disable

Options: Enable | Disable

Function: Specifies whether or not to use loopback diagnostic mode on this line. In loopback diagnostic mode, the router retransmits received data to the sender.

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.2.11.1.7

Parameter: Cell Insertion

Path: **ATM** Connector > **Line Attributes** > ATM/ALC Parameters > **Physical** > Physical Interface Attributes

Default: Unassigned

Options: Idle | Unassigned

Function: In the absence of user cells, the framer device fills idle bandwidth with either idle or unassigned cells.

Instructions: Select Idle or Unassigned.

MIB Object ID: 1.3.6.1.4.1.18.3.4.23.2.11.1.49

E1 Line Parameters

You access the E1 Line Parameters from the Configuration Manager.

Parameter: Enable

Path: **E1** Connector > **Edit Line** > Edit E1 Parameters
Default: Enable
Options: Enable | Disable
Function: Enables or disables the E1 line.
Instructions: Set to Disable if you want to disable the E1 line.
MIB Object ID: 1.3.6.1.4.1.18.3.4.11.1.2

Parameter: HDB3S Support

Path: **E1** Connector > **Edit Line** > Edit E1 Parameters
Default: Enable
Options: Enable | Disable
Function: Enables or disables high-density bipolar coding (a mechanism to maintain sufficient 1s density within the E1 data stream).
Instructions: Enable or disable this parameter, depending on the ability of the associated E1 equipment to support HDB3S.
MIB Object ID: 1.3.6.1.4.1.18.3.4.11.1.7

Parameter: Clock Mode

Path: **E1** Connector > **Edit Line** > Edit E1 Parameters
Default: Internal
Options: Manual | Slave | Internal
Function: Specifies the source of the E1 transmit clock.
Instructions: Select Internal to indicate that the router sets the clock.

Select Slave to indicate that the incoming data stream sets the clock.

Select Manual to indicate that the jumpers on the E1 link module set the clock. Refer to *Installing and Maintaining BN Routers* or *Installing and Maintaining ASN Routers and BNX Platforms* for information on configuring hardware jumpers.

MIB Object ID: 1.3.6.1.4.1.18.3.4.11.1.8

Parameter: **Mini Dacs**

Path: **E1** Connector > **Edit Line** > Edit E1 Parameters

Default: Idle

Options: Idle │ Data │ Voice │ Circuit 1 │ Circuit 2

Function: Assigns a specific function to each E1 channel.

Instructions: Select Idle to make the channel idle.

Select Data to assign the channel to voice pass-through (E1 connector to E1 connector).

Select Circuit 1 to assign the channel to the first E1 connector.

Select Circuit 2 to assign the channel to the second E1 connector.

MIB Object ID: 1.3.6.1.4.1.18.3.4.11.1.9

Parameter: **Line Type**

Path: **E1** Connector > **Edit Line** > Edit E1 Parameters

Default: E1

Options: E1 │ E1CRC4

Function: Enables or disables a 4-byte CRC on received frames.

Instructions: Select E1CRC4 if the E1 equipment expects a 4-byte CRC trailer at the end of each frame.

MIB Object ID: 1.3.6.1.4.1.18.3.4.11.1.18

HSSI Line Parameters

You access the HSSI Line Parameters from the Configuration Manager.

Parameter: **Enable**

Path: **HSSI** Connector > **Edit Line** > Edit HSSI Parameters

Default: Enable

Options: Enable │ Disable

Function: Enables or disables this HSSI line.

Instructions: Set this parameter to either Enable or Disable for this line.

MIB Object ID: 1.3.6.1.4.1.18.3.4.7.1.2

Parameter: **BofL**

Path: **HSSI** Connector > **Edit Line** > Edit HSSI Parameters

Default: Enable

Options: Enable | Disable

Function: Enables the transmission of proprietary Ethernet-encapsulated Bof L messages *over a point-to-point connection* between the local router and a remote peer.

Instructions: Set to Enable or Disable, depending on whether you want to transmit BofL messages over this HSSI interface. If you enable BofL locally, you must also configure the remote peer to enable BofL.

We recommend that you enable BofL for point-to-point connections between Bay Networks peers. If, however, such a connection occurs through a wide area transport service such as Frame Relay or SMDS, you must disable BofL.

MIB Object ID: 1.3.6.1.4.1.18.3.4.7.1.7

Parameter: **BofL Frequency**

Path: **HSSI** Connector > **Edit Line** > Edit HSSI Parameters

Default: 1 second

Options: 0 to 60 seconds

Function: Specifies the interval in seconds between BofL transmissions. This parameter is valid only if BofL is set to Enable.

After sending a BofL message, the router starts a timer that has a value equal to 5 times the setting of this parameter. If the router does not receive a BofL message from the remote peer before the timer expires, the router disables the HSSI circuit, and then attempts to restart it.

Instructions: Accept the default, 1 second, or specify a new value, making certain that both ends of the point-to-point connection are configured with the same value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.7.1.8

Parameter: **MTU**

Path: **HSSI** Connector > **Edit Line** > Edit HSSI Parameters

Default: 4608 bytes

Options: 3 to 4608 bytes

Function: Specifies the buffer size (the Maximum Transmission Unit) for the HSSI port and, therefore, determines the largest frame that can travel across the HSSI port.

Instructions: Set this parameter to a value appropriate for your network.

MIB Object ID: 1.3.6.1.4.1.18.3.4.7.1.9

Parameter: **WAN Protocol**

Path: **HSSI** Connector > **Edit Line** > Edit HSSI Parameters

Default: None

Options: Standard │ PassThru │ PPP │ SMDS │ Frame Relay | ATM DXI

Function: Indicates which WAN protocol you enabled on this HSSI circuit.

Instructions: Accept this setting. Changing the protocol here will not reconfigure the interface.

MIB Object ID: 1.3.6.1.4.1.18.3.4.7.1.12

Parameter: **Transmission Interface**

Path: **HSSI** Connector > **Edit Line** > Edit HSSI Parameters

Default: DS3

Options: DS1 │ DS3

Function: Specifies the appropriate MIB for the local management interface (LMI) to use, as long as you enable LMI and configure SMDS or Frame Relay across the HSSI interface. The HSSI driver provides no support for either the DS1 or DS3 MIB. Rather, the external DCE (for example, a DL3200 SMDS CSU/DSU from Digital Link) may provide MIB support.

Instructions: Select a DS1 MIB (specified by RFC 1232) or a DS3 MIB (specified by RFC 1233) depending on the carrier services the attached DCE device provides (DS1 at 1.54 MB/s, or DS3 at 44.736 MB/s).

MIB Object ID: 1.3.6.1.4.1.18.3.4.7.1.13

Parameter: **External Clock Speed**

Path: **HSSI** Connector > **Edit Line** > Edit HSSI Parameters

Default: 46359642 (44.736 MB/s)

Options: 307200 to 52638515

Function: Specifies the bandwidth that the HSSI channel provides.

The HSSI specification requires that the DCE provide a transmit clock that times data transfer across the DTE/DCE interface. The value you set for this parameter does not actually affect hardware initialization. Some routing protocol software uses this parameter value for route selection.

Instructions: Enter a value equal or close to the data transmission rate across the HSSI.

MIB Object ID: 1.3.6.1.4.1.18.3.4.7.14

Parameter: **CRC Size**

Path: **HSSI** Connector > **Edit Line** > Edit HSSI Parameters

Default: 32 bit

Options: 16 bit | 32 bit

Function: Specifies an error detection scheme. You can choose either 16-bit (standard ITU-T) or 32-bit (extended) to detect errors in the packet.

Instructions: Set this parameter to either 16-bit or 32-bit, making certain that the remote end of the HSSI connection is configured for the same value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.7.15

LAPB Parameters

You access the Link Access Procedure Balanced (LAPB) Line Parameters from the Configuration Manager.

Note: When you edit an Octal Sync link module line, or any synchronous line on Bay Networks AN or ASN routers, the router automatically configures the LAPB protocol if you configure a circuit for the X.25 protocol. The Edit SYNC Parameters window for these lines includes an additional button for editing LAPB parameters.

Parameter: **Enable**

Path: **COM** Connector for X.25 Interface > **Edit Line** > LAPB > Edit LAPB Parameters

Default: Enable

Options: Enable | Disable

Function: Globally enables or disables LAPB services.

Instructions: Select Disable to disable LAPB services.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.2

Parameter: **Station Type**

Path: **COM** Connector for X.25 Interface > **Edit Line** > LAPB > Edit LAPB Parameters

Default: DTE

Options: DTE | DCE | DXE

Function: Identifies the station type, that is, whether the device is a DTE or DCE, for this interface.

Instructions: If your device is data terminal equipment, select DTE. If your device is data communications equipment, select DCE. If you do not want to assign a specific station type, and instead want the network to determine the station type, choose DXE. This value indicates that the router is in unassigned mode; it is neither a DTE nor a DCE. If you select DXE, the router will send an exchange identification (XID), but negotiation will not take place until the network assigns a station type.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.7

Parameter: **Control Field**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: Modulo 8

Options: Modulo 8 | Modulo 128

Function: Specifies the desired window size, or modulo, of the sequence numbering that the router uses to number frames.

Instructions: Select the appropriate window size for your configuration.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.8

Parameter: **Max N1 Frame Size (octets)**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: 256 bytes

Options: 3 to 4500 bytes

Function: Specifies the frame size, in bytes, for a frame that the router or network transmits. This number excludes flags and 0 bits inserted for transparency.

Instructions: Select the frame size that suits your network configuration.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.9

Parameter: **Window Size**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: 7

Options: 1 to 127

Function: Specifies the default transmit and receive window size for the interface. This value is the maximum number of unacknowledged sequence frames that may be outstanding from the router or the network at any one time.

Instructions: Enter the appropriate window size for your configuration.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.10

Parameter: **Max N2 Retries**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: 10

Options: 1 to 64

Function: Determines the value of the N2 retry count, which is the number of retransmission attempts that the router makes, per frame, before it considers the line to be down. The retry count is the maximum number of attempts following the expiration of the T1 timer.

Instructions: Specify the number of times you want the router to try to retransmit.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.11

Parameter: **Max T1 Acknowledge Timer (seconds)**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: 30 seconds

Options: 1 to 9999 seconds

Function: Specifies the maximum time, in seconds, that the router waits for an acknowledgment of a frame that it has sent to the network.

Instructions: Enter the maximum time, in seconds, that you would like the router to wait for a frame acknowledgment from the network.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.12

Parameter: **Max T2 Acknowledge Timer (seconds)**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: 1 second

Options: 1 to 9999 seconds

Function: Specifies the time, in seconds, that the router waits before sending an acknowledgment for a sequenced frame. A value of 1 means that the router does not delay before generating an acknowledgment.

Instructions: Enter the amount of time that you want the router to wait before acknowledging a frame.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.13

Parameter: **Max T3 Disconnect Timer (seconds)**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: 60 seconds

Options: 1 to 9999 seconds

Function: Specifies the time, in seconds, that the router waits before determining that the link is disconnected. A value of 1 indicates that once the router completes the frame exchange to bring down the link, it considers the link disconnected.

Instructions: Enter the amount of time that you want the router to wait before it decides that the link is disconnected.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.14

Parameter: **Initiate Link Setup Action**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: Active

Options: Active | Passive

Function: Identifies whether or not the router initiates link setup or waits for the network to initiate.

Instructions: Enter Active if you want the router to initiate link setup, or Passive if you want the network to initiate link setup.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.16

Parameter: **Enable Rx/Tx of XID Frames**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: Disable

Options: Enable | Disable

Function: Enables or disables the transmission and reception of test exchange identification (XID) frames by the router.

Instructions: Select Enable to allow the router to send XID frames. Select Disable to prevent the router from sending XID frames.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.17

Parameter: **Command/Response Address**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: DTE

Options: DTE | DCE

Function: Specifies the local command or response address, which is the DTE or DCE value expressed as a single octet.

Instructions: Enter DTE for the DTE address, or DCE for the DCE address.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.18

Parameter: **WAN Protocol**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: Standard

Options: Standard | X.25

Function: Specifies the WAN protocol you want on this interface.

Instructions: Select the Standard (Wellfleet Standard PPP) or X.25.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.20

Parameter: **Network Link Type**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: NET2

Options: GOSIP | NET2

Function: Sets the link type used with the X.25 network hardware.

Instructions: Select NET2 or GOSIP.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.39

Parameter: **Idle RR Frames**

Path: **COM** Connector for X.25 Interface > **Edit Line** > **LAPB** > Edit LAPB Parameters

Default: Off

Options: On | Off

Function: Enables or disables the transmission and reception of RR frames during periods when there are no information frame exchanges. When this parameter is set to On, an RR is transmitted when no traffic is present on the physical media.

Instructions: Select On or Off.

MIB Object ID: 1.3.6.1.4.1.18.3.5.1.8.1.40

MCE1 and MCT1 Logical Line Parameters

You access the MCE1 and MCT1 logical line parameters from the Configuration Manager.

Parameter: Enable/Disable

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines
Default: Enable
Options: Enable | Disable
Function: Enables or disables the logical line.
Instructions: Select Enable or Disable.
MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.2

Parameter: Breath of Life (BofL) Enable/Disable

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines
Default: Enable
Options: Enable | Disable
Function: When you set this parameter to Enable, a BofL packet is sent out on the wire as often as the value you specify for the BofL Timeout.
Instructions: Set to Disable only if you want to end transmission of BofL packets.
MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.8

Parameter: BofL Timeout

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines
Default: 5 seconds
Options: 1 to 60 seconds
Function: Indicates the time period between Breath of Life packets.
Instructions: Set the time between BofL packets in seconds.
MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.9

Parameter: **Fractional Loopback**

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines

Default: Disable

Options: Enable │ Disable

Function: Specifies whether or not to use diagnostic loopback mode on this circuit. In this mode, the router retransmits received data to the sender.

Instructions: Select Enable only if you want the port in loopback mode.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.10

Parameter: **WAN Protocol**

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines

Default: Standard

Options: For MCE1: Standard │ PPP │ SMDS │ Frame Relay | SDLC

For MCT1: Standard │ Passthru | PPP │ SMDS │ Frame Relay

Function: Specifies the WAN protocol you configured for this logical line.

Instructions: Accept the current value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.14

Parameter: **Service**

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines

Default: LLC1

Options: Transparent │ LLC1

Function: Sets the HDLC service type for this line. Transparent is basic HDLC mode. LLC1 adds the HDLC address and control fields as a prefix to the frame.

Instructions: Select the logical line HDLC service.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.15

Parameter: Local HDLC Address

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines
Default: 7
Options: DCE | 2 | DTE | 4 | 5 | 6 | 7
Function: Specifies the 1-byte HDLC address of this logical line . DCE is an address of 1; DTE is address 3.
Instructions: DCE, DTE, or an explicit address value.
MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.16

Parameter: Remote HDLC Address

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines
Default: 7
Options: DCE | 2 | DTE | 4 | 5 | 6 | 7
Function: Specifies the 1-byte HDLC address of this logical line . DCE is an address of 1; DTE is address 3.
Instructions: DCE, DTE, or an explicit address value.
MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.17

Parameter: Rate Adaptation

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines
Default: 64 K LSB
Options: 64 K | 56 K MSB | 56 K LSB
Function: Determines the number of bits and their bit positions within the timeslot. The 64 K selection uses all 8 bits in the timeslot. The two 56 K selections use 7 of the 8 bits in the timeslot. The 56 K MSB selection does not use the most significant bit, and the 56 K LSB selection does not use the least significant bit in the timeslot.
Instructions: Select the line rate adaptation.
MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.18

Parameter: **Interframe Time Fill Character**

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines

Default: Flags

Options: Flags | Idles

Function: Specifies the interframe time-fill pattern for transmission across this circuit. Flags selects an 0x7E pattern (0 1 1 1 1 1 1 0); Idles selects an 0xFF pattern (1 1 1 1 1 1 1 1).

Instructions: Set the line interframe time-fill character.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.19

Parameter: **CRC Size**

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines

Default: 16 bit CRC

Options: 32 bit CRC | 16 bit CRC

Function: Specifies the Cyclic Redundancy Check (CRC) type. With 16-bit CRC, the router appends a 16-bit CRC to the transmitted frames and performs a 16-bit CRC on received frames. With 32-bit CRC, the router appends a 32-bit CRC to transmitted frames and performs a 32-bit CRC on received frames.

Instructions: Set the CRC size.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.20

Parameter: **MTU Size (bytes)**

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines

Default: 1600 bytes

Options: 3 to 4608 bytes

Function: Specifies the transmit/receive buffer size (Maximum Transmission Unit) to configure the largest frame that the router can transmit or receive across this MCE1 port. The router discards frames larger than this value.

Instructions: Enter a value in the range 3 to 4608 bytes.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.55

Parameter: **Remote Loopback Detection**

Path: Configured **MCE1** or **MCT1** Connector > MCE1/T1 Logical Lines

Default: Disable

Options: Enable | Disable

Function: Enables or disables detection of the driver's own BofL packets, providing you set the Breath of Life (BofL) Enable/Disable parameter to Enable. If you select Enable and put the line into loopback mode the downstream driver will bring down the interface when it detects its own BofL packets

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.56

Parameter: **BERT Mode**

Path: Configured **QMCT1** Connector > MCT1 Logical Lines

Default: Disable

Options: Enable | Disable

Function: Selecting Enable activates BERT mode.

Instructions: To enter BERT mode, select Enable and click on Apply.

You can only configure this parameter for QMCT1 link modules.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.62

Parameter: **BERT Test Pattern**

Path: Configured **QMCT1** Connector > MCT1 Logical Lines

Default: Ones

Options: Zeros | Ones | QRSS | 2e15 | 2e15 Inverted | 2e20 | 2e23 | 2e23 Inverted

Function: Specifies the bit pattern transmitted during BERT diagnostics. When a port is in BERT mode, it can generate patterns such as all 1s, all 0s, or a QRSS (quasi-random signal sequence) pattern.

Instructions: Select a test pattern and click on Apply.

You can only configure this parameter for QMCT1 link modules.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.63

Parameter:	**Accept Fractional Loopback Code**
Path:	Configured **QMCT1** Connector (in Dynamic Mode) > MCT1 Logical Lines
Default:	Enable
Options:	Enable | Disable
Function:	Determines whether or not the logical line can accept fractional T1 loopback code.
Instructions:	Select Enable or Disable. You can only configure this parameter for QMCT1 link modules.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.??

MCE1 Port Parameters

You access the MCE1 port parameters from the Configuration Manager.

Parameter:	**Port Application Mode**
Path:	Unconfigured **MCE1** Connector > Port Application
Default:	NONPRI
Options:	NONPRI | PRI
Function:	Specifies the application that the logical lines of this port provide.
Instructions:	Select NONPRI to indicate that all the lines permanent circuit number and are for leased lines, Frame Relay, or permanent connections for other non-ISDN PRI applications. Select PRI to indicate that the lines are for switched circuits using ISDN. You must configure NONPRI applications for MCE1-I interfaces.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.1.16

Parameter: **Primary Clock**

Path: MCE1 **CLOCK** Connector > Edit Slot x DS1/E1 Clock Parameters

Default: Port 1 Ext Loop

Options: Internal │ Port 1 Ext Loop │ Port 2 Ext Loop │ Auxiliary Ext

Function: Identifies the primary source of the timing signals.

Instructions: Select Internal to use the clock chip on the link or net module.

Select Port 1 Ext Loop to use the signal coming from Port 1.

Select Port 2 Ext Loop to use the signal coming from Port 2 (Dual MCE1 only).

Select Auxiliary Ext to use an external source via BNC connectors.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.1.1.4

Parameter: **Secondary Clock**

Path: MCE1 **CLOCK** Connector > Edit Slot x DS1/E1 Clock Parameters

Default: Internal

Options: Internal │ Port 1 Ext Loop │ Port 2 Ext Loop │ Auxiliary Ext

Function: Identifies the secondary source of the timing signals. The router uses the secondary clock only when the primary clock becomes unavailable.

Instructions: Select Internal to use the clock chip on the link or net module.

Select Port 1 Ext Loop to use the signal coming from Port 1.

Select Port 2 Ext Loop to use the signal coming from Port 2 (Dual MCE1 only).

Select Auxiliary Ext to use an external source via BNC connectors.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.1.1.5

Parameter: **Enable/Disable**

Path: **MCE1** Connector > Edit Logical Lines > **Port Details** > MCE1 Port Parameters

Default: Enable

Options: Enable │ Disable

Function: Enables or disables the MCE1 port.

Instructions: Set to Disable only if you want to disable the MCE1 port.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.2

Parameter: Line Type

Path: **MCE1** Connector > Edit Logical Lines > **Port Details** > MCE1 Port Parameters

Default: E1

Options: E1 | E1 CRC | E1 MF | E1 CRC MF

Function: Specifies the framing format.

Instructions: Select the appropriate frame format for your E1 equipment.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.6

Parameter: Line Coding

Path: **MCE1** Connector > Edit Logical Lines > **Port Details** > MCE1 Port Parameters

Default: HDB3

Options: AMI | HDB3

Function: Specifies a line coding method. AMI line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCE1 link module remains synchronized upon receiving up to 45 consecutive 0s.)

HDB3 line coding maintains sufficient 1s density within the E1 data stream. It replaces a block of eight consecutive binary 0s with an 8-bit HDB3 code containing bipolar violations in the fourth and seventh bit positions of the substituted code. In the receive direction, the HDB3 code is detected and replaced with eight consecutive binary 0s.

Instructions: Select the line coding method.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.7

Parameter: **Setup Alarm Threshold (seconds)**

Path: **MCE1** Connector > Edit Logical Lines > **Port Details** > MCE1 Port Parameters

Default: 2 seconds

Options: 2 to 10 seconds

Function: Specifies the time interval during which MCE1 tolerates a performance defect or anomaly. If the performance defect or anomaly is still present when this time interval expires, MCE1 records a performance failure and logs an event message.

Instructions: Set the timer value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.7

Parameter: **Clear Alarm Threshold (seconds)**

Path: **MCE1** Connector > Edit Logical Lines > **Port Details** > MCE1 Port Parameters

Default: 2 seconds

Options: 2 to 10 seconds

Function: Specifies the clear time for performance failure conditions. If the defect or anomaly clears within this time interval, MCE1 records a performance-cleared condition and logs an event message.

Instructions: Set the timer value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.8

Parameter: **International Bit**

Path: **MCE1** Connector > Edit Logical Lines > **Port Details** > MCE1 Port Parameters

Default: Disable

Options: Enable | Disable

Function: Specifies whether the international bit should be set in the E1 frame.

Instructions: Select Enable to set the international bit, or select Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.16

Parameter: **Line Impedance**

Path: ASN **MCE1** Connector > Edit Logical Lines > **Port Details** > MCE1 Port Parameters

Default: 120 Ohm

Options: 120 Ohm | 75 Ohm

Function: For the ASN MCE1 net module only, specifies Line impedance.

Instructions: Set the line impedance.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.20

MCT1 Port Parameters

You access the MCT1 port line parameters from the Configuration Manager.

Parameter: **Port Application Mode**

Path: Unconfigured MCT1 Connector > Port Application

Default: NONPRI

Options: NONPRI | PRI

Function: Specifies the application that the logical lines of this port provide.

Instructions: Select NONPRI to indicate that all the lines permanent circuit number and are for leased lines, Frame Relay, or permanent connections for other non-ISDN PRI applications.

Select PRI to indicate that the lines are for switched circuits using ISDN.

You must configure NONPRI applications for MCE1-I interfaces.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.1.16

Parameter: **Primary Clock**

Path: MCT1 **CLOCK** Connector > Edit Slot x DS1/E1 Clock Parameters

Default: Port 1 Ext Loop

Options: Internal │ Port 1 Ext Loop │ Port 2 Ext Loop │ Auxiliary Ext

Function: Identifies the primary source of the timing signals.

Instructions: Select Internal to use the clock chip on the link or net module.

Select *Port 1 Ext Loop* to use the signal coming from Port 1.

Select *Port 2 Ext Loo*p to use the signal coming from Port 2 (Dual MCT1 only).

Select Auxiliary Ext to use an external source via BNC connectors.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.1.1.4

Parameter: **Secondary Clock**

Path: MCT1 **CLOCK** Connector > Edit Slot x DS1/E1 Clock Parameters

Default: Internal

Options: Internal │ Port 1 Ext Loop │ Port 2 Ext Loop │ Auxiliary Ext

Function: Identifies the secondary source of the timing signals. The router uses the secondary clock only when the primary clock becomes unavailable.

Instructions: Select Internal to use the clock chip on the link or net module.

Select *Port 1 Ext Loop* to use the signal coming from Port 1.

Select *Port 2 Ext Loo*p to use the signal coming from Port 2 (Dual MCT1 only).

Select Auxiliary Ext to use an external source via BNC connectors.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.1.1.5

Parameter: **Enable/Disable**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: Enable

Options: Enable │ Disable

Function: Enables or disables the MCE1 port.

Instructions: Set to Disable only if you want to disable the MCE1 port.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.2

Parameter: **Line Type**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: ESF

Options: Unframed T1 | ESF | SF/D4

Function: Specifies the framing format.

ESF transmits superframes consisting of 24 individual SF/D4 frames and provides enhanced signaling and synchronization.

SF/D4 transmits superframes consisting of 12 individual frames.

Instructions: Select the appropriate frame format for your T1 equipment. Use Unframed T1 only with BERT mode to match the line type.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.6

Parameter: **Line Coding**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: B8ZS

Options: AMI | B8ZS

Function: Specifies a line coding method. AMI line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCT1 link module remains synchronized upon receiving up to 45 consecutive 0s.)

B8ZS (Bipolar with 8-Zero substitution) line coding replaces a block of eight consecutive binary 0s with an 8-bit B8ZS code containing bipolar violations in the fourth and seventh bit positions of the substituted code. In the receive direction, the B8ZS code is detected and replaced with eight consecutive binary 0s.

Instructions: Select the line coding method.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.7

Parameter: **Signal Level (dB)**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: 0.0 dB

Options: -15 dB | -7.5 dB | 0.0 dB | 0.5 dB | 0.8 dB | 1.1 dB | 1.5 dB

Function: Specifies the T1 transmit power level in decibels (dB).

The DS1 values of -15 and -7.5 dB are long-haul and the carrier determines these values if 0.0 dB is not sufficient.

The DSX1 values of 0.0, 0.5, 0.8, 1.1, and 1.5 dB are short-haul and correlate with cable length as follows:

- 0.0 dB -- 0 to 133 ft.
- 0.5 dB -- 133 to 255 ft.
- 0.8 dB -- 266 to 399 ft.
- 1.1 dB -- 399 to 533 ft.
- 1.5 dB -- 533 to 655 ft.

Instructions: Specify the decibel level according to the length of the cable or as the carrier specifies.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.6

Parameter: **Setup Alarm Threshold (seconds)**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: 2 seconds

Options: 2 to 10 seconds

Function: Specifies the time interval during which MCT1 tolerates a performance defect or anomaly. If the performance defect or anomaly is still present when this time interval expires, MCT1 records a performance failure and logs an event message.

Instructions: Set the timer value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.7

Parameter: **Clear Alarm Threshold (seconds)**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: 2 seconds

Options: 2 to 10 seconds

Function: Specifies the clear time for performance failure conditions. If the defect or anomaly clears within this time interval, MCT1 records a performance-cleared condition and logs an event message.

Instructions: Set the timer value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.8

Parameter: **FDL Configuration**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: ANSI 403

Options: ANSI 403 | AT&T 54016 | None

Function: Selects a Facility Data Link (FDL) mode only when the line is configured with an ESF line type. The default, ANSI 403 mode, conforms to the 1989 ANSI T1.403 specification (*Carrier-to-Customer Installation DS1 Metallic Interface*); AT&T 54016 conforms to the 1989 AT&T specification (*Requirements for Interfacing Digital Terminal Equipment to Services Employing the Extended Superframe Format*).

Instructions: Specify the operational mode.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.14

Parameter: **Remote FDL HDLC Address Mode**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: BY

Options: AZ | BY

Function: Selects the FDL address mode to determine whether the near-end FDL responds to HDLC address BY or AZ in messages from the far-end FDL.

Instructions: Specify the address mode.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.9

Parameter: **Accept Loopback Request**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: Enable

Options: Enable | Disable

Function: Enables or disables loop-up and loop-down code detection circuitry in the link module. When this parameter is enabled, this interface accepts and complies with requests to go into loopback mode from a far-end device.

Instructions: Enable or disable local loopback.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.10

Parameter: **Loopback Configuration**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: No Loopback

Options: No Loopback | Payload Loopback | Line Loopback

Function: Setting this parameter forces the DS1 interface into loopback. The far-end or intermediate equipment then performs diagnostics on the network between that equipment and the DS1 interface.

- *Payload Loopback* -- The received signal at this interface is looped through the device. Typically the received signal is looped back for retransmission after it has passed through the device's framing function.
- *Line Loopback* -- The received signal does not go through the framing device (minimum penetration) but is looped back out.

Instructions: Select the loopback configuration option for testing. After testing, set this parameter to No Loopback to return the interface to normal operation.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.10

QMCT1 Port Parameters

In addition to the parameters in the previous section, the Port Parameters window for the QMCT1 link module includes the following configurable parameters.

Parameter: **Send Performance Measurement CR Addr**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: Customer Inst

Options: Customer Inst | Carrier

Function: Specifies the source of performance messages; Customer Inst. indicates that the customer installation supplies the messages, and Carrier indicates that the carrier supplies the messages.

You configure this parameter only for QMCT1 link modules.

Instructions: Select the source for outgoing performance messages.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.18

Parameter: **Accept Perf Measurement CR Addr**

Path: **MCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: Customer Inst

Options: Customer Inst | Carrier

Function: Specifies the source from which the router accepts performance messages; Customer Inst. indicates that the router accepts messages only from the customer installation, and Carrier indicates that the router accepts messages only from the carrier.

You configure this parameter only for QMCT1 link modules.

Instructions: Select the source for inbound performance messages.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.19

Parameter: **Primary Clock**

Path: **QMCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: Port 1 Ext Loop

Options: Internal | Port 1 Ext Loop | Port 2 Ext Loop | Auxiliary Ext

Function: Identifies the primary source of the timing signals.

Instructions: Select Internal to use the clock chip on the link or net module.

Select *Port 1 Ext Loop* to use the signal coming from Port 1.

Select *Port 2 Ext Loo*p to use the signal coming from Port 2.

Select *Port 3 Ext Loop* to use the signal coming in from Port 3 (QMCT1 only).

Select *Port 4 Ext Loop* to use the signal coming in from Port 4 (QMCT1 only).

Select Auxiliary Ext to use an external source via BNC connectors.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.18.1.3

Parameter: **Secondary Clock**

Path: **QMCT1** Connector > Edit Logical Lines > **Port Details** > MCT1 Port Parameters

Default: Internal

Options: Internal | Port 1 Ext Loop | Port 2 Ext Loop | Auxiliary Ext

Function: Identifies the secondary source of the timing signals. The router uses the secondary clock only when the primary clock becomes unavailable.

Instructions: Select Internal to use the clock chip on the link or net module.

Select *Port 1 Ext Loop* to use the signal coming from Port 1.

Select *Port 2 Ext Loo*p to use the signal coming from Port 2.

Select *Port 3 Ext Loop* to use the signal coming in from Port 3.

Select *Port 4 Ext Loop* to use the signal coming in from Port 4.

Select Auxiliary Ext to use an external source via BNC connectors.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.18.1.4

Synchronous Line Parameters

You access the synchronous line parameters from the Configuration Manager.

Parameter: **Enable**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Enable

Options: Enable | Disable

Function: Enables or disables this synchronous line.

Instructions: Set this parameter to either Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.2

Parameter: **BofL**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Enable

Options: Enable | Disable

Function: Enables the transmission of proprietary BofL messages *over a point-to-point connection* between the local router and a remote peer.

Instructions: Set to Enable or Disable, depending on whether you want to transmit BofL messages over this synchronous interface. If you enable BofL locally, the remote peer must also be configured to enable BofL.

We recommend that you enable BofL for point-to-point connections between Bay Networks peers. However, if such a connection is accomplished through a wide-area transport service such as Frame Relay, X.25, or SMDS, you must disable BofL.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.7

Parameter: **BofL Timeout**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 5 seconds

Options: 1 to 60 seconds

Function: Specifies the time between transmissions of BofL messages from this synchronous interface. Timeout will occur if five periods elapse without both a successful frame transmission and a successful reception. When timeout occurs, the router disables and re-enables the synchronous line. For example, if you set this parameter to 5 seconds, the interface must successfully transmit and receive a frame within 25 seconds. Timeout occurs in 25 seconds.

This parameter is valid only if you set BofL to Enable.

Instructions: Either accept the default, 5 seconds, or specify a new value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.8

Parameter: **MTU**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 1600 bytes

Options: 3 to 4608 bytes

Function: Specifies the largest frame (Maximum Transmission Unit) that the router can transmit on this line.

Instructions: Set this parameter to a value appropriate for your network. For X.25, use a value at least 5 bytes more than the maximum packet size for the packet level.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.9

Parameter: **Promiscuous**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Disable

Options: Enable | Disable

Function: Specifies whether address filtering based on the local and remote address is enabled. If you set this parameter to Enable, all frames are received. If you set this parameter to Disable, only frames destined for this local address are received.

Instructions: Set this parameter to Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.11

Parameter: **Clock Source**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: External

Options: External | Internal

Function: Specifies the origin of the synchronous timing signals (clock). If you set this parameter to Internal, this router supplies the required timing signals. If you set this parameter to External, an external network device supplies the required timing signals. In most cases, this parameter should be set to External.

Instructions: Set this parameter to either Internal or External, as appropriate for your network.

For direct connection to a control unit, such as an IBM 3174, set to Internal. For connection to a modem, set to External. For direct connection to an IBM 3745, either the router or the IBM 3745 can provide the clock source. If the IBM 3745 does not provide clocking, set to Internal.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.13

Parameter: **Internal Clock Speed**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 64 KB (19200 KB for SDLC)

Options: 1200 B | 2400 B | 4800 B | 7200 B | 9600 B | 19200 B | 32000 B | 38400 B | 56 KB | 64 KB | 125 KB | 230 KB | 420 KB | 625 KB | 833 KB | 1.25 MB | 2.5 MB | 5 MB

Function: Sets the clock speed of an internally supplied clock when the Clock Source parameter is set to Internal. Attached devices must be capable of operating at the specified speed.

Instructions: Set the clock speed for the internal clock to the desired data transmission rate across the synchronous line.

Some of the more common allowed speeds for IBM products are as follows:

- An IBM 3274 with an V.24/RS-232 interface supports up to 9600 bps. Some support speeds up to 19200 bps.
- An IBM 3274 with a V.35 interface supports up to 64 Kb/s.
- An IBM 3174 with a V.24/RS-232 interface supports up to 19200 bps.
- An IBM 3174 with a V.35 interface and running Licensed Internal Code-C supports up to 256 Kb/s

You cannot set this parameter when the Clock Source parameter is set to External.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.14

Parameter: **Signal Mode**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Balanced

Options: Balanced | Unbalanced

Function: Specifies balanced or unbalanced transmission. Balanced transmission uses two conductors to carry signals; unbalanced uses one conductor to carry a signal, with a ground providing the return path.

Instructions: Set this parameter to either Balanced or Unbalanced, depending on the signaling mode of the connected device.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.15

Parameter: **RTS Enable**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Disable

Options: Enable | Disable

Function: Enables or disables the detection of RTS signals on this interface.

Instructions: Set this parameter to Enable if the connected device (for example, a modem or a KG84A cryptographic device) uses RTS/CTS flow control.

For manual dial modems (2-wire), set this parameter to Enable. For leased modems (4-wire), set this parameter to Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.16

Parameter: **Burst Count**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Enable

Options: Enable | Disable

Function: Specifies single or multiple DMA burst cycles. If you set this parameter to Enable, the chip performs eight-word bursts. If you set this parameter to Disable, single-word burst cycles are performed.

Instructions: Select Enable or Disable

This is a performance-tuning parameter. You should set it to Enable except in certain cases with DSDE (5430 - Dual Sync, Dual Ethernet) and DSE (5420 - Dual Sync, Single Ethernet) link modules. Set it to Disable if excessive TxUflo or RxOflo errors occur on the Ethernet ports. If you have configured both synchronous ports, disable this parameter first on the synchronous interface that is either running at a lower clock speed or carries lower-priority traffic.

You should disable this parameter on both synchronous interfaces only if those interfaces are DSDE configurations and you configured both Ethernet interfaces. In these configurations, disable this parameter on both synchronous interfaces if disabling it on only one interface does not eliminate the excessive TxUflo or RxOflo errors on the two Ethernet interfaces.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.17

Parameter: **Service**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: LLC1

Options: Transparent | LLC1 | LAPB

Function: Specifies the link-level protocol for this circuit. If you set this parameter to Transparent, then raw HDLC mode is in effect. LLC1 specifies connectionless datagram service; it prefixes the HDLC address and control fields to the frame.

Instructions: Set this parameter as appropriate for this circuit. If X.25 is enabled on this line, you must set this parameter to LAPB

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.18

Parameter: **Retry Count**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 16 attempts

Options: 1 to 64 attempts

Function: Indicates the number of retransmission attempts allowed per frame before a line is declared down.

Instructions: Accept the default, or enter a number from 1 to 64.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.19

Parameter: **Link Idle Timer**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 9 seconds

Options: 1 to 9999 seconds

Function: Indicates the number of seconds before a line is determined to be idle. An idle line is disabled.

Instructions: Accept the default, or enter a number from 1 to 9999.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.20

Parameter: **Retry Timer**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 300 tenths of a second (3 seconds)

Options: 1 to 99999 tenths of a second

Function: Indicates the time the router waits for a response from the link. The router sends Link Control frames when this timer expires, resends the frames up to the value of the Retry Count parameter, and then disconnects the link.

Instructions: Enter a timeout value in tenths of seconds.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.21

Parameter: **Extended Address**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Disable

Options: Enable | Disable

Function: Enables or disables testing of the address length. When you set this parameter to Enable, the router tests the first bit of the address to determine the length of the address, in octets.

Instructions: Accept the default, or select Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.22

Parameter: **Extended Control (S and I frames)**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Disable

Options: Enable | Disable

Function: Allows the control fields of all S- and I- frames to become two octets in length instead of one. Numbering of all I-frames becomes Modulo 128 instead of Modulo 8.

Instructions: Accept the default or select Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.24

Parameter: **Transmit Window Size**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 1 frame

Options: 1 to 7 frames

Function: Controls the number of I-frames that can be transmitted without acknowledgment.

Instructions: Either accept the default value, or enter a new value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.27

Parameter: **Minimum Frame Spacing**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 1 flag

Options: 1 to 32 flags

Function: Specifies the number of flags transmitted between adjacent frames.

Instructions: Set this parameter to the appropriate number of flags.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.29

Parameter: **Local Address**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 7

Options: 1 to 255

Function: Specifies the 1-byte HDLC address of this synchronous interface. This interface will receive only frames whose HDLC address matches this address.

Instructions: Specify 1 for DCE, 3 for DTE, or any other address between 1 and 255.

If you configure X.25 on this line, set this parameter to either 1 (DCE) or 3 (DTE).

Use a unique HDLC address for the local and remote interfaces at either end of a point-to-point connection. If you configure a device at one end with a local address of 1 (DCE) and remote address of 3 (DTE), you must configure the device at the other end with a local address of 3 (DTE) and remote address of 1 (DCE).

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.30

Parameter: Remote Address

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 7

Options: 1 to 255

Function: Specifies the 1-byte HDLC address of the remote synchronous interface. This is the HDLC address which will be used to address all frames transmitted by this interface.

Instructions: Use a unique HDLC address for the local and remote interfaces at either end of a point-to-point connection. If you configure a device at one end with a local address of 1 (DCE) and remote address of 3 (DTE), you must configure the device at the other end with a local address of 3 (DTE) and remote address of 1 (DCE).

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.31

Parameter: Pass Thru Local Address

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: None

Options: Any unique MAC address of exactly 12 hexadecimal digits

Function: Assigns a MAC address to the local interface. This address becomes the source address of packets that are bridged to the destination MAC address. You assign the destination MAC address with the Pass Thru Remote Address parameter.

Instructions: Enter a unique MAC address for the local interface, making sure that the second digit is a zero; for example, 10fffabc5432.

Be sure to reverse the local and remote MAC addresses at the remote synchronous pass-through interface.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.32

Parameter: **Pass Thru Remote Address**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: None

Options: Any unique MAC address of exactly 12 hexadecimal digits

Function: Assigns a MAC address to the remote interface. This address becomes the destination MAC address of packets that are bridged to the local MAC address. You assign the source MAC address with the Pass Thru Local Address parameter.

Instructions: Enter a unique MAC address for the remote interface, making sure that the second digit is a zero; for example, 10fffabc5432.

Be sure to reverse the local and remote MAC addresses at the remote synchronous pass-through interface.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.33

Parameter: **WAN Protocol**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: None

Options: Standard | PassThru | PPP | SMDS | Frame Relay | X.25 | ATM DXI | LAPB | SDLC

Function: Indicates which WAN protocol has been enabled on this synchronous circuit.

Instructions: Accept the current value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.34

Parameter: **CRC Size**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 16 bit

Options: 16 bit | 32 bit

Function: Specifies an error-detection scheme. You can choose either 16-bit (standard) or 32-bit (extended) frame check sequence (FCS) to detect errors in the packet.

Instructions: Set this parameter to either 16-bit or 32-bit.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.35

Parameter: **Sync Media Type**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Default

Options: Default | T1 | E1 | RAISEDTR | V25BIS | ISDN | ISDNLEASEDLINE

Function: Specifies the signaling method that the router uses for this line.

Instructions: Select the media type appropriate for this line.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.54

Parameter: **Idle RR Frames**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Off

Options: On | Off

Function: Indicates whether or not the router sends a receiver ready (RR) signal when the Link Idle Timer expires.

Instructions: Accept the default or select On if you want the router to send RRs.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.61

Parameter: **KG84A Cycle**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 100 milliseconds

Options: 5 | 10 | 25 | 50 | 100 | 200 | 500

Function: Specifies the timer cycle's length, in milliseconds. This cycle value is used by the timers on the other KG84A devices on the network. This also becomes the polling cycle for monitoring FCS errors.

Instructions: Accept the default or select one of the valid options, and be sure to set the RTS Enable parameter to Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.67

Parameter: **KG84A Sync Loss Interval**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 50 cycles

Options: 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500

Function: Specifies how many cycles the router should wait after detecting an FCS error to receive a valid frame before declaring that a loss of synchronization has occurred.

Instructions: Accept the default or select one of the valid options, and be sure to set the RTS Enable parameter to Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.68

Parameter: **KG84A Remote Resync Wait**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 200 cycles

Options: 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500

Function: Specifies the number of cycles that the router waits for the remote KG84A device to complete a resynchronization operation, when synchronization is lost and a remotely initiated resynchronization has been detected. After this number of cycles, the router software determines that the resynchronization failed and initiates another resynchronization.

Note that if you press the RESYNC button on the local KG84A device, the router responds as if it were a remotely initiated resynchronization

Instructions: Use different settings at each end of the point-to-point link to avoid a possible race condition, and be sure to set the RTS Enable parameter to Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.69

Parameter: **KG84A Sync Pulse**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 10 milliseconds (ms)

Options: 2 to 4096 ms

Function: Specifies the length of the pulse that the router transmits to the KG84A device when it is necessary to initiate KG84A resynchronization.

The router uses the RTS signal of the V.35 interface, which connects to the KG84A device's synchronous signal via a special cable, to initiate KG84A resynchronization. When the router wants to initiate KG84A resynchronization, it changes the value of the synchronous signal from low to high. This parameter specifies the number of ms that the synchronous signal retains its high value.

Instructions: Accept the default or select one of the valid options, and be sure to set the RTS Enable parameter to Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.70

Parameter: **Sync Polling**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Disable

Options: Enable | Disable

Function: Indicates whether the Data Set Ready (DSR) signal will be monitored. If you set this parameter to Enable, the synchronous driver will be enabled when the DSR is detected. When the DSR is no longer detected, the driver will be disabled. Enable this parameter only if you will be using dialup services.

Instructions: Either accept the default or set this parameter to Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.76

Parameter: **Sync Hold Down Time**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 0 seconds

Options: 0 to 9999 seconds

Function: Specifies a time period for the router to wait before bringing up this line when using dial services. This delay allows time for the primary line to recover, before de-activating a backup line.

Instructions: Enter the number of seconds to wait before bringing up this line.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.80

Parameter: **Network Link Level**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: NET2

Options: NET2 | GOSIP | SYNC_TYPE_C03

Function: Indicates the link level for this synchronous point-to-point connection. The default is NET2. Change this parameter to GOSIP when this synchronous point-to-point connection is part of a GOSIP-compliant network (such as DOD). Change this parameter to SYNC_TYPE_C03 when you are running X.25 on a synchronous board with the MK-5025 C03 chip.

Instructions: Accept the default, NET2, or select GOSIP or SYNC_TYPE_C03.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.81

Parameter: **Cable Type**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Null

Options: Null | RS232 | RS422 | V35 | X21

Function: Specifies the cable interface to the network.

Instructions: When the interface connects to a dial-up device for switched services, set to reflect the cable interface type that connects the dial unit. For an SDLC interface, set to RS232.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.83

Parameter: **Sync Line Coding**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: NRZ

Options: NRZ | NRZI | NRZI Mark

Function: Specifies the line coding of the physical synchronous line. On AN or ASN routers, and on a router with an Octal Sync link module, you can change the value to match the line coding of a device at the other end of the line.

Instructions: Select NRZ for Non-Return to Zero coding.

Select NRZI for Non-Return to Zero Inverted coding.

Select NRZI Mark for Non-Return to Zero Inverted Mark coding.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.88

Parameter: **Remote Loopback Detection**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Disable

Options: Enable | Disable

Function: Enables or disables Remote Loopback Detection. If BofL is enabled, the device driver detects when it is receiving its own BofL packets and disables the interface, assuming that the link has been put into loopback.

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.91

Parameter: **External Clock Speed**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 64102 bits/s

Options: 1200 to 6000000 bits/s

Function: Sets the clock speed of an externally supplied clock when the Clock Source parameter is set to External.

Instructions: Set the clock speed for the external clock to the data transmission rate that most closely corresponds to the speed of the external clock. You cannot set this parameter when the Clock Source parameter is set to Internal.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.93

Parameter: **Sync B Channel Override**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: Default

Options: BCHANNEL1 | BCHANNEL2 | DEFAULT | FLOATINGB

Function: Specifies which B Channel this line is using for ISDN. By default, the B Channel is tied to the selected connector.

On AN and ANH routers, you can use this parameter to override the Site Manager default and connect the B Channel to a specific serial communications controller (SCC).

Instructions: Select DEFAULT to use the channel Site Manager assigns.

Select BCHANNEL1 or BCHANNEL2 to explicitly assign the B Channel.

Select FLOATINGB to use only one B Channel of ISDN, which becomes BCHANNEL1 or BCHANNEL2 depending on the call setup procedures. COM1 and COM2 become available in this mode.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.94

Parameter: **Sync Priority**

Path: **COM** Connector > **Edit Line** > Edit Sync Parameters

Default: 1

Options: 1 to 50

Function: Used by dial or switched services to assign priority to lines within the same demand or backup pool. For example, the router uses a line of priority 1 before it uses a line of priority 2.

Instructions: Assign a priority number to each line in the backup pool. The lower the number, the higher the priority.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.97

T1 Line Parameters

You access the T1 line parameters from the Configuration Manager.

Parameter: Enable

Path: **T1** Connector > **Edit Line** > Edit T1 Parameters
Default: Enable
Options: Enable | Disable
Function: Enables or disables the T1 line.
Instructions: Set to Disable if you want to disable the T1 line.
MIB Object ID: 1.3.6.1.4.1.18.3.4.10.1.2

Parameter: Frame Type

Path: **T1** Connector > **Edit Line** > Edit T1 Parameters
Default: ESF
Options: ESF | D4
Function: Selects either ESF (extended superframe) or D4 framing format. D4 transmits superframes consisting of 12 individual frames. ESF, in contrast, transmits superframes consisting of 24 individual D4 frames and provides enhanced signaling and synchronization.
Instructions: Select ESF or D4, based on the frame format that the associated T1 equipment requires.
MIB Object ID: 1.3.6.1.4.1.18.3.4.10.1.7

Parameter: B8ZS Support

Path: **T1** Connector > **Edit Line** > Edit T1 Parameters
Default: Disable
Options: Disable | Enable
Function: Enables or disables B8ZS (bipolar with 8-zero substitution), a mechanism that maintains T1 synchronization.
Instructions: Select Enable or Disable, depending on the ability of the associated T1 equipment to support B8ZS.
MIB Object ID: 1.3.6.1.4.1.18.3.4.10.1.9

Parameter: **Line Buildout**

Path: **T1** Connector > **Edit Line** > Edit T1 Parameters

Default: 1 foot

Options: 1 to 655 ft.

Function: Conditions router signals to mitigate attenuation, which depends on the physical length of the T1 line.

Instructions: Enter the approximate length of the cable connecting the router and the associated T1 equipment.

MIB Object ID: 1.3.6.1.4.1.18.3.4.10.1.8

Parameter: **Clock Mode**

Path: **T1** Connector > **Edit Line** > Edit T1 Parameters

Default: Internal

Options: Internal | Slave | Manual

Function: Specifies the source of the T1 transmit clock.

Instructions: Select the clocking mode, making certain that the associated T1 equipment is compatible.

Select Internal to indicate that the router sets the clock.

Select Slave to indicate that the incoming data stream sets the clock.

Select Manual to indicate that the jumpers on the E1 link module set the clock. Refer to *Installing and Maintaining BN Routers* or *Installing and Maintaining ASN Routers and BNX Platforms* for information on hardware configurations.

MIB Object ID: 1.3.6.1.4.1.18.3.4.10.1.10

Parameter: **Mini Dacs**

Path: **T1** Connector > **Edit Line** > Edit T1 Parameters

Default: Idle

Options: Idle │ Data │ Voice │ Circuit 1 │ Circuit 2

Function: Assigns a specific function to each T1 channel.

Instructions: Assign the appropriate function to the T1 channels.

Select Idle to make the channel idle.

Select Data to assign the channel to voice pass-through (E1 connector to E1 connector).

To configure data and voice pass-through, assign identical channels to data or voice on both T1 connectors.

Select Circuit 1 to assign the channel to the first E1 connector. Not that you cannot allocate T1 channels to both T1 circuits.

Select Circuit 2 to assign the channel to the second E1 connector.

MIB Object ID: 1.3.6.1.4.1.18.3.4.10.1.11

Editing Multiline Configuration Parameters

You access the Data Path Chooser parameter from the Configuration Manager.

Parameter:	**Data Path Chooser**
Path:	Interface Connector for a Multiline Circuit > Edit Circuit > Lines > Multiline > Edit Multiline Options
Default:	Address Based
Options:	Address Based | Random
Function:	Specifies how this multiline circuit distributes outbound traffic over its data paths.
Instructions:	Select *Address Based* if the router always uses the same data path to send traffic between the same source and destination address. This method ensures that packets arrive in the correct sequence. Select *Random* if the router assigns a set of numbers to each data path. The router then generates a random number for each outbound packet, and assigns the packet to the data path with the matching number. This method ensures even distribution of traffic among the data paths in a multiline circuit, but does not ensure that packets arrive in the correct sequence.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.4.1.1.23

Editing Line Resource Reservation Parameters

You access the Line Resource Manager (LRM) configuration parameters from the Configuration Manager.

Parameter: Estimated Bandwidth

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: 0 bits/s

Options: 0 to 214748364 bits/s

Function: Specifies the estimated usable bandwidth for this line.

Instructions: Enter the estimated total bandwidth for this line in bits/s. To enable line resource management, enter a value greater than zero. For point-to-point lines, you can usually enter the total line speed.

For an Ethernet line, you must estimate a value, because shared-media lines may not have all of the bandwidth available. You can base the estimate on line statistics, the number of connected workstations, or other site-specific information.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.3

Parameter: Reservable Bandwidth

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: 0 bits/s

Options: 0 to 214748364 bits/s

Function: Specifies the reservable bandwidth for this line.

Instructions: To enable ST2 reservable resources, enter the portion of this line's bandwidth that you want to make available for ST2 requests for guaranteed service. The value must be greater than 0 and less than the value of the Estimated Bandwidth parameter. Do not make all available bandwidth reservable; leave at least 15 percent for network management and routing protocols.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.4

Parameter: Traffic Queuing Algorithm

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: None

Options: None | Priority

Function: Specifies the queuing algorithm for all reserved traffic.

Instructions: Select None to use best-effort scheduling. Use best-effort scheduling if you want to use the resource reservation protocol (ST2) to control admission of flows to the network, but do not want to explicitly schedule each flow's packets.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.5

Parameter: Policing Algorithm

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: None

Options: None | Leaky Bucket

Function: Specifies whether or not to use the Leaky Bucket policing algorithm for reserved traffic. With Leaky Bucket policing, LRM makes sure that all ST2 packets using reserved bandwidth follow the flowspec that appears in the ST2 connect request. LRM discards any packets that do not adhere to the flowspec. Note that such policing requires additional processing by the router.

Instructions: Select None to bypass policing if an upstream router is policing traffic, or if the applications generating the reserved traffic consistently adhere to the flowspec and do not require policing.

Enter Leaky Bucket to apply a Leaky Bucket policing algorithm to reserved traffic.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.6

Parameter: **Bandwidth Interval (Secs)**

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: 10 seconds

Options: 1 to 214748364 seconds

Function: Specifies the interval over which LRM measures instantaneous bandwidth.

Instructions: Enter a time interval in seconds if the default value of 10 seconds is not sufficient.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.7

Parameter: **Inflate Reservations Percentage**

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: 0 percent

Options: 0 to 100 percent

Function: Specifies that LRM adds a safety buffer to each ST2 reservation on this line by increasing bandwidth requests by a specified percentage.

Instructions: To inflate reservations made on this line, enter a percent value to increase each bandwidth request. Increase the value of this parameter if you notice that the LRM is discarding packets because applications generating reserved traffic are exceeding their flowspecs.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.8

Parameter: **Unreserved Policing Algorithm**

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: Queue Limit

Options: Queue Limit | Leaky Bucket

Function: Specifies the policing algorithm for unreserved traffic.

Instructions: Select the Queue Limit option to restrict the number of buffers (packets) of unreserved traffic that LRM queues. This method of policing enables unreserved traffic to use available reserved bandwidth. The Unreserved Queue Length parameter specifies the maximum number of packets in the queue.

Select the Leaky Bucket option to cause the router to actively police the unreserved traffic based on the unreserved bandwidth. This method does not allow unreserved traffic to take advantage of available reserved bandwidth.

If you enable priority queuing for this line, the router uses the priority queue parameters to perform Queue Limit policing. See *Configuring Traffic Filters and Protocol Prioritization* for information about priority queue parameters.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.9

Parameter: **Unreserved Queue Length**

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: 20 packets

Options: 0 to 214748364 packets (limited by available buffers)

Function: If the Unreserved Policing Algorithm parameter is set to Queue Limit, this parameter specifies the maximum number of unreserved (best-effort) packets to be held in queue for transmission.

After the queue length reaches this value, the router discards best-effort traffic when congestion occurs.

Priority queuing limits, if configured, override the value of this parameter.

Instructions: Change this value to adjust the queue length limit.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.10

Parameter: **Multiline Select Algorithm**

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: First Fit

Options: First Fit │ Round Robin

Function: Specifies how LRM selects which line to use for a new resource request, if you have LRM configured on a multiline circuit.

Instructions: Set this parameter only if you configured LRM on a multiline circuit.

Select First Fit to always use the first available line that can service reserved traffic requests. Select Round Robin to rotate the use of lines available to service requests. All lines for a circuit must use the same algorithm. If any one line on a circuit specifies First Fit, all lines use the first-fit algorithm.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.11

Parameter: **Multiline Threshold Bandwidth**

Path: **XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources

Default: 0 bits/s

Options: 0 to 214748364 bits/s

Function: Specifies how the first-fit algorithm works, providing you set the Multiline Select Algorithm parameter to First Fit. If you accept the default value, LRM uses the simple first-fit algorithm. If you select a value greater than 0, LRM still uses the first available line with reservable bandwidth to service requests, but moves to the next available line after reaching the configured threshold. When all lines are at their threshold, LRM returns to using the simple first-fit algorithm.

Instructions: Set this parameter only if you have configured LRM on a multiline circuit and have set the Multiline Select Algorithm parameter to First Fit.

Accept the default or enter a number less than the value of the Reservable Bandwidth parameter.

MIB Object ID: 1.3.6.1.4.1.18.3.5.16.2.1.3.1.12

Parameter:	**Reservation Latency**
Path:	**XCVR**, **HSS**I, **MCT1**, or **COM** Connector configured for the ST2 protocol > **Edit Line Resources** > Edit Line Resources
Default:	50 milliseconds (ms)
Options:	0 to 214748364 ms
Function:	Specifies the maximum latency for a reserved flow packet, limiting the amount of unreserved data that the link scheduler can transmit. When the data transmit ring reaches a size where the time to transmit the data is greater than the value of this parameter, no more unreserved data will be queued.
Instructions:	Reduce the value of this parameter to obtain better delay characteristics for reserved flows, but note that overall throughput may decrease. Increase the default value to improve throughput, but note that reserved-flow delays may increase.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.13

Appendix B
Default Line Parameter Settings

This appendix lists the default settings for line attribute, multiline, and Line Resource Manager (LRM) parameters, in the following sections:

- Asynchronous Line Parameters
- ATM ARE Line Parameters
- ATM FRE-2 Line Parameters
- E1 Line Parameters
- Ethernet (CSMA/CD) Line Parameters
- FDDI Line Parameters
- LAPB Parameters
- HSSI Line Parameters
- MCE1 Line Parameters
- MCT1 Line Parameters
- Synchronous Line Parameters
- T1 Line Parameters
- Multiline Parameters
- Line Resource Manager Parameters

You can use the Configuration Manager to edit any of the default settings.

Asynchronous Line Parameters

Table B-1. Asynchronous Line Parameters

Parameter	Default
Enable	Enable
MTU	1000
Start Protocol	Answer
Remote IP Addr	None
Remote Port	7
Local Port	2100
Baud Rate	9600
Idle Timer	20 s
Receive Window	4096
TCP KeepAlive	8 s
TCP Inactive Limit	300 s
Cfg TxQ Length	None
Cfg RxQ Length	None

ATM FRE-2 Line Parameters

Table B-2. ATM FRE-2 Line Parameters

Parameter	Default
Enable	Enable
Data Path Notify	Enable
Data Path Notify Timeout	3 s
SVC Inactivity Timeout Enable	Enable
SVC Inactivity Timeout (Secs)	1200 s

Table B-3. ATM FRE-2 Physical Attribute Parameters

Parameter	Default
Framing Mode	SONET
Scrambling	Enable
Loopback	Disable
Cell Insertion	Unassigned

ATM ARE Line Parameters

Table B-4. ATM ARE Line Parameters

Parameter	Default
Enable	Enable
Interface MTU	4608
Data Path Enable	Enable
Data Path Notify Timeout	1 s
SVC Inactivity Timeout Enable	Enable
SVC Inactivity Timeout (Secs)	1200 s
Framing Mode	SONET
Clocking Signal Source	Internal
DS3 Line Build Out	Short
DS3 Scrambling	On

E1 Line Parameters

Table B-5. E1 Line Parameters

Parameter	Default
Enable	Enable
Line Type	E1
HDB3S Support	Disable
Clock Mode	Internal
Mini Dacs	Idle

Ethernet (CSMA/CD) Line Parameters

Table B-6. Ethernet Line Parameters

Parameter	Default
Enable	Enable
BOFL Enable	Enable
BOFL Timeout	5 s
Hardware Filter (10-Mb/s Ethernet only)	Disable (this default is changed to Enable if you add a circuit and reply OK to the prompt `Do you want to enable Hardware Filters on this circuit?`)
Interface Line Speed (100-Mb/s Ethernet only)	100BASE-TX/100BASE-FX
Line Advertising Capabilities (100-Mb/s Ethernet only)	11

FDDI Line Parameters

Table B-7. FDDI Line Parameters

Parameter	Default
Enable	Enable
BOFL Enable	Enable
BOFL Timeout	3 s
Hardware Filter	Disable (this default is changed to Enable if you add a circuit and reply OK to the prompt `Do you want to enable Hardware Filters on this circuit?`)

Table B-8. FDDI SMT Attribute Parameters

Parameter	Default
Connection Policy	0xff65
T_Notify Timeout (s)	22 s
Trace Max Expiration (ms)	7000 ms (7 s)
Status Report Protocol	Enable
Duplicate Address Protocol	Enable
User Data	None

Table B-9. FDDI MAC Attribute Parameters

Parameter	Default
LLC Data Enable	Enable

Table B-10. FDDI Path Attribute Parameters

Parameter	Default
Tvx Lower Bound (ms)	2.5 ms
T_Max Lower Bound (ms)	165 ms
Requested TTRT (ms)	165 ms

Table B-11. FDDI Port Attribute Parameters

Parameter	Default
LER Cutoff	7
LER Alarm	8

HSSI Line Parameters

Table B-12. HSSI Line Parameters

Parameter	Default
Enable	Enable
BOFL	Enable
BOFL Frequency	1 s
MTU	4608
WAN Protocol	None
Transmission Interface	DS3
External Clock Speed	46359642 (44.736 MB/s)
CRC Size	32 bit

LAPB Parameters

Table B-13. LAPB Parameters

Parameter	Default
Enable	Enable
Station Type	DTE
Control Field	Modulo 8
Max N1 Frame Size (octets)	1600
Window Size	7
Max N2 Retries	10
Max T1 Acknowledge Timer (seconds)	3 s
Max T2 Acknowledge Timer (seconds)	1 s
Max T3 Disconnect Timer (seconds)	60 s
Initiate Link Setup Action	Active
Enable Rx/Tx of XID Frames	Enable
Idle RR Frames	Off
Command/Response Address	DTE
WAN Protocol	Standard

MCE1 Line Parameters

Table B-14. MCE1 Clock Parameters

Parameter	Default
Primary Clock	Port 1 Ext Loop
Secondary Clock	Internal

Table B-15. MCE1 Port Application Parameters

Parameter	Default
Port Application Mode	NONPRI

Table B-16. MCE1 Port Parameters

Parameter	Default
Enable/Disable	Enable
Line Type	E1
Line Coding	HDB3
Setup Alarm Threshold (seconds)	2 s
Clear Alarm Threshold (seconds)	2 s
International Bit	Disable
Line Impedance	120

Table B-17. MCE1 Logical Line Parameters

Parameter	Default
Enable/Disable	Enable
Breath of Life (BOFL) Enable/Disable	Enable
BOFL Timeout (seconds)	5 s
Fractional Loopback	Disable
WAN Protocol	Standard
Service	LLC1
Local HDLC Address	7
Remote HDLC Address	7
Rate Adaptation	64 K LSB

(continued)

Table B-17. MCE1 Logical Line Parameters *(continued)*

Parameter	Default
Interframe Time Fill Character	Flags
CRC Size	16 bit CRC
MTU Size (bytes)	1600

Table B-18. MCE1 Port Action Parameters

Parameter	Default
BERT Mode Enable	Disable
BERT Send Alarm	Disable
BERT Test Pattern	Ones
International Bit	Disable
Line Coding	HDB3
Line Type	None

MCT1 Line Parameters

Table B-19. MCT1 Clock Parameters (All Modules except QMCT1)

Parameter	Default
Primary Clock	Port 1 Ext Loop
Secondary Clock	Internal

Table B-20. MCT1 Port Application Parameters

Parameter	Default
Port Application Mode	NONPRI

Table B-21. QMCT1 Clock Parameters

Parameter	Default
Primary Clock	Internal
Secondary Clock	Internal

Table B-22. MCT1 Port Parameters

Parameter	Default
Enable/Disable	Enable
Line Type	ESF
Line Coding	B8ZS
Signal Level (dB)	0.0 dB
Setup Alarm Threshold (seconds)	2 s
Clear Alarm Threshold (seconds)	2 s
FDL Configuration	ANSI 403
Remote FDL HDLC Address Mode	BY
Accept Loopback Request	Enable
Loopback Configuration	No Loopback
Send Performance Measurement CR Addr	prmCi
Accept Perf Measurement CR Addr	prmCi

Table B-23. MCT1 Logical Line Parameters

Parameter	Default
Enable/Disable	Enable
BOFL Enable/Disable	Enable

(continued)

Table B-23. MCT1 Logical Line Parameters *(continued)*

Parameter	Default
BOFL Timeout (seconds)	5 s
Fractional Loopback	Disable
WAN Protocol	Standard
Service	LLC1
Local HDLC Address	7
Remote HDLC Address	7
Rate Adaptation	56 K LSB
Interframe Time Fill Character	Flags
CRC Size	16 bit CRC
MTU Size (bytes)	1600
Remote Loopback Detection	Disable
Bert Mode	Disable (QMCT1 only)
Bert Test Pattern	Ones (QMCT1 only)
Accept Fractional Loopback Code	Enable (QMCT1 only)
Line Resources	None

Table B-24. MCT1 Port Action Parameters

Parameter	Default
BERT Mode Enable	Disable
BERT Send Alarm	Disable
BERT Test Pattern	Ones
Line Coding	B8ZS
Line Type	ESF
Signal Level	0.0

Table B-25. QMCT1 Logical Line Action Parameters

Parameter	Default
Bert Mode Enable	Disable
Bert Test Pattern	Ones
Accept Fractional Loopback	Enable
Accept Fractional Loopback (Proprietary)	Disable

Synchronous Line Parameters

Table B-26. Synchronous Line Parameters

Parameter	Default	LAPB Default (X.25 Configured on AN or ASN)
Enable	Enable	Enable
BOFL	Enable (Disable if X.25 is enabled)	Disable
BOFL Timeout	5 s	5 s
MTU	1600	512
Promiscuous	Disable	Enable
Clock Source	External	External
Internal Clock Speed	64 KB	64 KB
External Clock Speed	64102	64102
Signal Mode	Balanced	Balanced
RTS Enable	Disable	Enable
Burst Count	Enable	not applicable
Service	LLC1 (LAPB if X.25 is enabled)	Transparent
Transmit Window Size	1 (7 if X.25 is enabled)	not applicable
Minimum Frame Spacing	1 (7 if X.25 is enabled)	1

(continued)

Table B-26. Synchronous Line Parameters *(continued)*

Parameter	Default	LAPB Default (X.25 Configured on AN or ASN)
Local Address	7 (1 or 3 if X.25 is enabled)	7
Remote Address	7 (1 or 3 if X.25 is enabled)	7
WAN Protocol	None	LAPB
Pass Thru Local Address	None	None
Pass Thru Remote Address	None	None
CRC Size	16 bit	16 bit
Sync Media Type	Default	Default
Sync Polling	Disable (Enable if X.25 is enabled)	Disable
Sync Line Coding	NRZ	NRZ
KG84A Cycle	100 ms	100 ms
KG84A Sync Loss Interval	50	50
KG84A Remote Resync Wait	200	200
KG84A Sync Pulse	10 ms	10 ms
Network Link Level	NET2	not applicable
Retry Count	16	not applicable
Link Idle Timer	9 s	not applicable
Extended Control (S and I frames)	Disable	not applicable
Idle RR Frames	Off	not applicable
Cable Type	Null	Null
Retry Timer	300 tenths of a second	not applicable
Extended Address	Disable	Disable
Remote Loopback Detection	Disable	Disable
Sync Hold Down Time	0 s	0 s
Sync Priority	1	1

T1 Line Parameters

Table B-27. T1 Line Parameters

Parameter	Default
Enable	Enable
Frame Type	ESF
B8ZS Support	Disable
Line Buildout	1
Clock Mode	Internal
Mini Dacs	Idle

Token Ring Line Parameters

Table B-28. Token Ring Line Parameters

Parameter	Default
Enable	Enable
MAC Address Override	None
MAC Address Select	PROM
Speed	16 MB/s
Early Token Release	Enable

Multiline Parameters

Table B-29. Multiline Parameters

Parameter	Default
Data Path Chooser	Address Based

Line Resource Manager Parameters

Table B-30. LRM Parameters

Parameter	Default
Estimated Bandwidth	0
Reservable Bandwidth	0
Traffic Queuing Algorithm	None
Policing Algorithm	None
Bandwidth Interval (Secs)	10 s
Inflate Reservations Percentage	0
Unreserved Policing Algorithm	Queue Limit
Unreserved Queue Length	20
Multiline Select Algorithm	First Fit
Multiline Threshold Bandwidth	0
Reservation Latency	50 ms

Appendix C
Testing MCE1 and MCT1 Interfaces

This chapter describes how to use the Configuration Manager to test single-line and multiline MCE1 and MCT1 circuits in the following sections:

- About the Tests
- Setting Test Parameters
- Running Port Tests
- Testing Individual Logical Lines (QMCT1 Only)

About the Tests

While in dynamic mode, you can use the Configuration Manager to trigger port actions to test the quality of MCE1 and MCT1 lines. Tests include

- Transmitting specific codes to the remote end of the MCE1 or MCT1 connection
- Introducing deliberate error patterns into the transmitted BERT (Bit Error Rate Test) bit stream

Note: Except for the QMCT1 module, all test actions are port-specific. For example, a BERT reset action resets all port-specific series of BERT counters. When testing ports on a QMCT1 module,

BERT statistics show the results of your test actions. You can view BERT statistics using the Statistics Manager utility. For information on the Statistics Manager, see *Managing Routers and BNX Platforms*.

Setting Test Parameters

Before you test a line, you must set the test parameters: Then, start the tests as described in the “Running Port Tests” section.

To set the test parameters:

1. **In dynamic mode, display the MCE1 or MCT1 Logical Lines window.**
2. **Click on Port Details.**

   The Port Parameters window appears.
3. **Click on Line Tests.**

Note: The Line Tests option appears only in dynamic mode.

The MCE1 Port Actions (Figure C-1) or MCT1 Port Actions (Figure C-2) window appears.

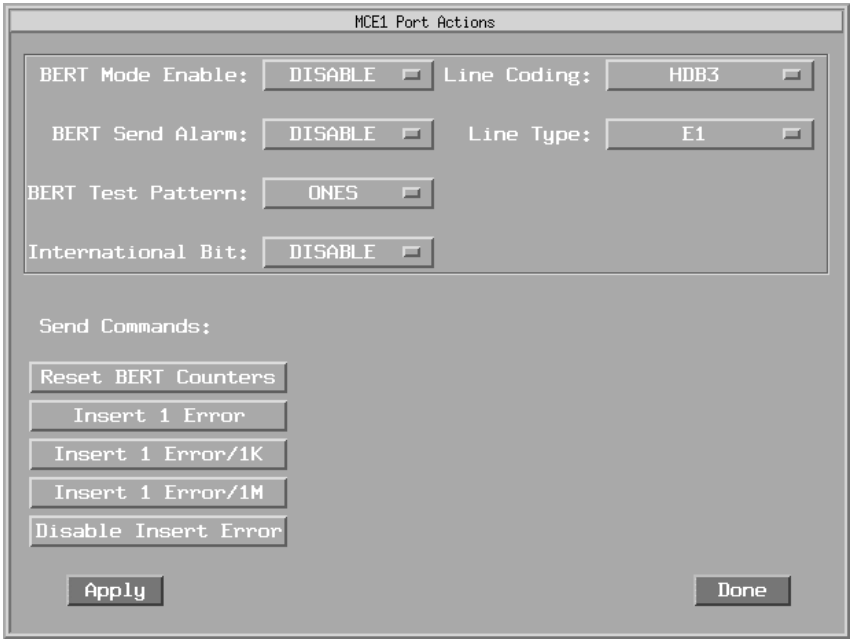

Figure C-1. MCE1 Port Actions Window

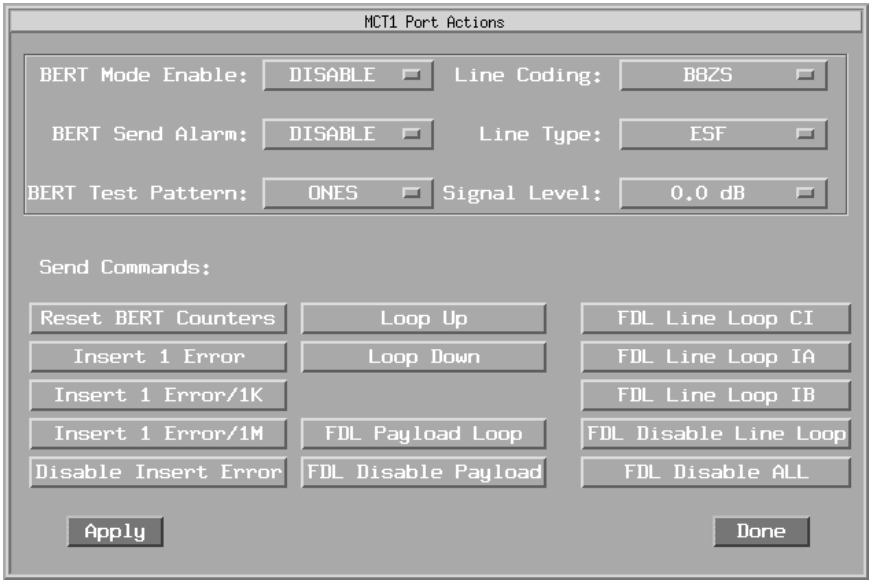

Figure C-2. MCT1 Port Actions Window

4. **Edit the port action parameters, located in the upper portion of the window.**
   - Enabling or Disabling BERT Mode
   - Setting the BERT Alarm Type
   - Setting the BERT Test Pattern
   - Setting the Line Coding Method
   - Setting the Line Type
   - Enabling or Disabling the International Bit (MCE1 Only)
   - Setting the Signal Level (MCT1 Only)
5. **Click on Apply.**
6. **Click on Done.**

Enabling or Disabling BERT Mode

Enable BERT mode for BERT testing.

By setting this parameter, you enable or disable BERT mode on all logical lines on all but QMCT1 interfaces. On QMCT1 interfaces, you can enable or disable BERT mode on individual logical lines.

Setting the BERT Alarm Type

You can specify the type of alarm signal to be generated while in BERT mode, or disable the generation of alarm messages altogether.

Select *AIS* (alarm indication signal) to transmit Blue alarms (all 1s). Select *Yellow* to transmit Yellow alarms (all 0s).

Setting the BERT Test Pattern

When a port is in BERT mode, it can generate patterns such as all 1s, all 0s, or a quasi-random signal sequence (QRSS) pattern. Valid test pattern options are:

- Zero
- Ones
- QRSS
- 2e15
- 2e15 Inverted
- 2e20
- 2e23
- 2e23 Inverted

Specify the bit pattern to be transmitted during BERT diagnostics.

Setting the Line Coding Method

How you set line coding depends on whether you are testing an MCE1 or MCT1 line.

MCE1 Lines

By default, the MCE1 interface uses high-density bipolar coding (HDB3) line coding testing. You can select T34AMI line coding method instead.

AMI line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCE1 link module remains synchronized upon receiving up to 45 consecutive 0s.)

MCT1 Lines

By default, the MCT1 interfaces uses B8ZS (Bipolar with 8-Zero substitution) line coding. You can select AMI line coding instead.

B8ZS line coding replaces a block of eight consecutive binary 0s with an 8-bit B8ZS code containing bipolar violations in the fourth and seventh bit positions of the substituted code. In the receive direction, the B8ZS code is detected and replaced with eight consecutive binary 0s.

AMI line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCT1 link module remains synchronized upon receiving up to 45 consecutive 0s.)

Setting the Line Type

How you set line type depends on whether you are testing an MCE1 or MCT1 line.

MCE1 Lines

Select the appropriate frame format for the associated E1 equipment.

- E1
- E1 CRC
- E1 MF
- E1 CRC MF

Note that the router does not support MF framing when you enable BERT mode.

MCT1 Lines

Each port is set to ESF by default. Select a line type for testing:

- SF/D4 -- Transmits superframes consisting of 12 individual frames. If this option is chosen, the FDL port actions do not apply and their buttons do not appear in the MCT1 Port Actions Window.
- ESF -- Transmits superframes consisting of 24 individual SF/D4 frames and provides enhanced signaling and synchronization.
- Unframed T1 -- Use to match the line type.

Enabling or Disabling the International Bit (MCE1 Only)

By default, MCE1 does not use the international bit in E1 frames. You can enable or disable use of the International Bit for testing an MCE1 interface.

Setting the Signal Level (MCT1 Only)

By default, the T1 transmit power level is 0.0 dB. Specify one of the following decibel level according to the length of the cable or as determined by the carrier.

- -15 dB
- -7.5 dB
- 0.0 dB
- 0.5 dB
- 0.8 dB
- 1.1 dB
- 1.5 dB

The DS1 values of -15 and -7.5 dB are long-haul; the carrier determines these values if 0.0 dB is not sufficient. The DSX1 values of 0.0, 0.5, 0.8, 1.1, and 1.5 dB are short-haul and correlate with cable length, as follows:

- 0.0 dB -- 0 to 133 ft
- 0.5 dB -- 133 to 266 ft
- 0.8 dB -- 266 to 399 ft
- 1.1 dB -- 399 to 533 ft
- 1.5 dB -- 533 to 655 ft

Running Port Tests

When you have set the MCE1 or MCT1 test parameters, you can test the line:

Caution: Initiating line tests on all but QMCT1 modules affects all logical lines associated with that port for the duration of the testing.

1. **Start at the MCE1 (Figure C-3) or MCT1 (Figure C-2) Port Actions window.**
2. **Click on the appropriate Send Command.**

   Refer to Table C-1 for a list of the commands and their functions.
3. **Click on Apply.**

Caution: Wait until the Port Actions window updates before selecting another action.

Table C-1. Send Commands for BERT Mode

Send Command	Function
Reset BERT Counters	Resets all counters to 0
Insert 1 Error	Inserts a single (non-repeating) error into the bit stream
Insert 1 Error/1K	Inserts a deliberate error into every thousandth position in the bit stream
Insert 1 Error/1M	Inserts a deliberate error into every millionth position in the bit stream
Disable Insert Error	Stops the insertion of deliberate errors into the bit stream

4. **Repeat Steps 2 and 3 for each test you want to run.**
5. **Click on Done.**

   The MCE1 or MCT1 Port Parameters window appears.

All changes you apply to the port in the MCE1 Port Actions window are effective only while the window is active. When you exit the MCE1 Port Actions window, all port settings revert to the original port settings.

Testing Individual Logical Lines (QMCT1 Only)

With QMCT1 modules, you can test one individual line associated with a port. When you are working with a QMCT1 module, and you click on Line Tests in the MCT1 Port Parameters window, the QMCT1 Port Actions window appears (Figure C-3).

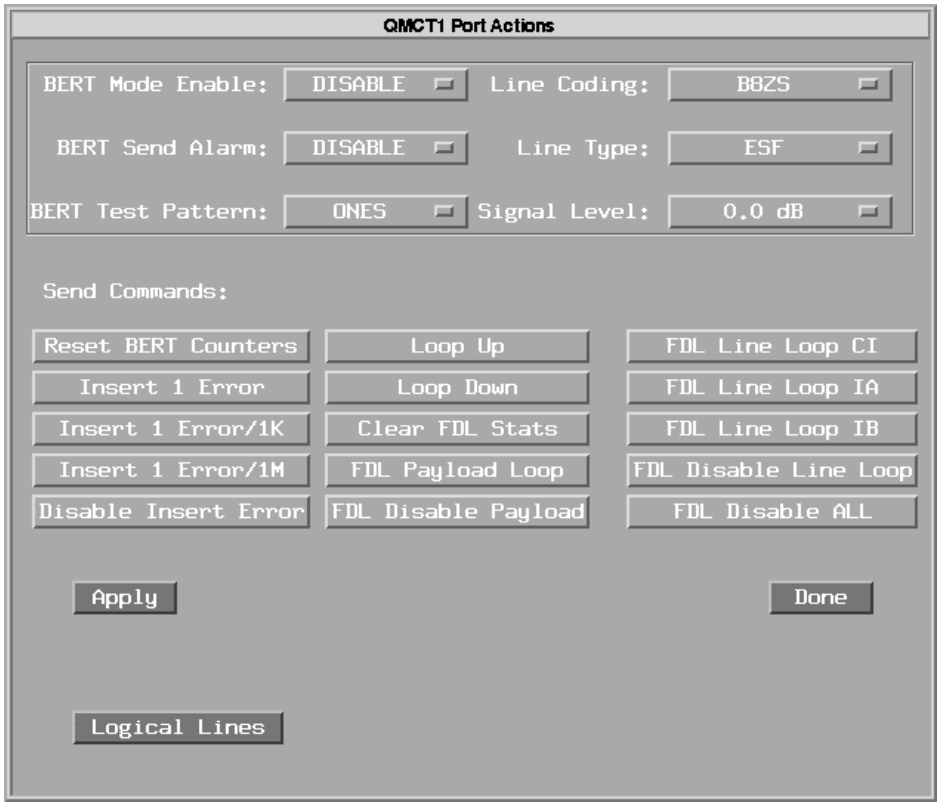

Figure C-3. QMCT1 Port Actions Window

To set the QMCT1 test parameters:

6. **Click on Logical Lines.**

   The QMCT1 Logical Line Actions window appears (Figure C-4).

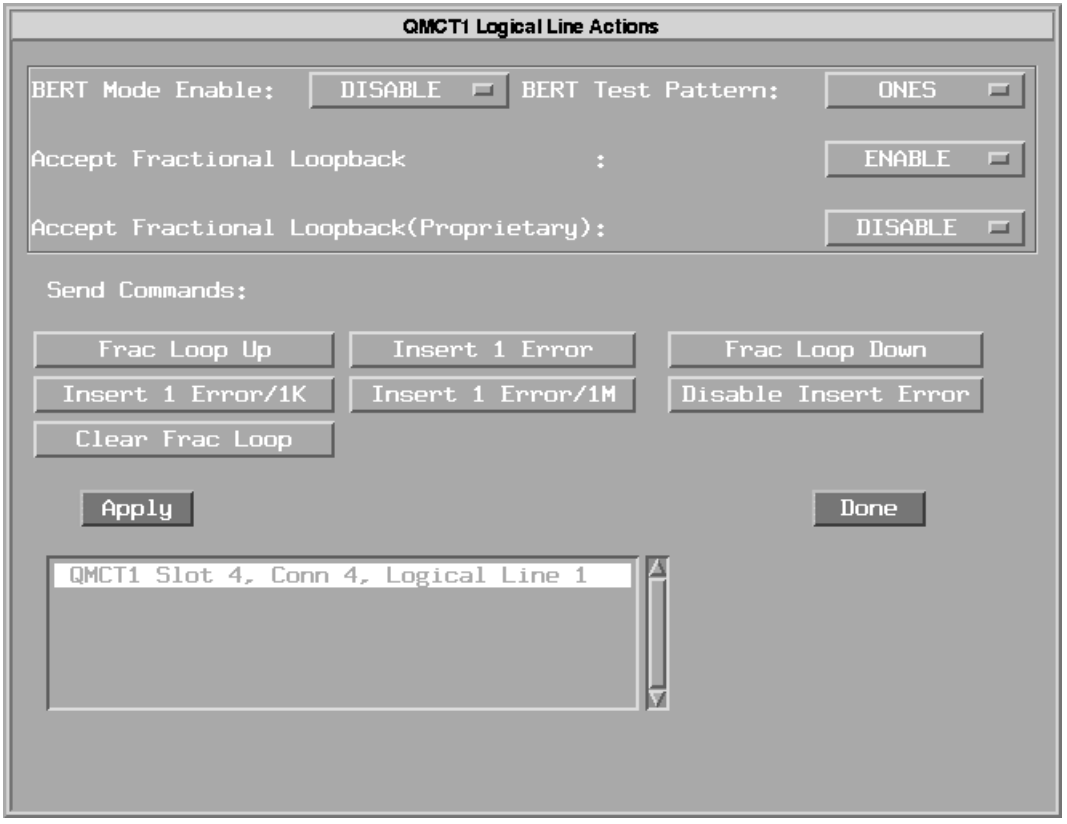

Figure C-4. QMCT1 Logical Line Actions Window

7. **Edit the Logical Line Action parameters.**

When you have set the test parameters, you can test the line.

To test the QMCT1 line:

1. **Start at the QMCT1 Logical Line Actions window.**
2. **Click on the appropriate Send Command.**

Refer to Table C-2 for a list of the commands and their functions.

Table C-2. Send Commands for QMCT1 BERT Mode

Send Command	Function
Frac Loop Up	Sends a loop-up code to the remote end
Insert 1 Error/1K	Inserts a deliberate error into every thousandth position in the bit stream
Clear Frac Loop	Transmits a loopback deactivate code to the remote end
Insert 1 Error	Inserts a single (non-repeating) error into the bit stream
Insert 1 Error/1M	Inserts a deliberate error into every millionth position in the bit stream
Frac Loop Down	Sends a loop-down code to the remote end
Disable Insert Error	Stops the insertion of deliberate errors into the bit stream

3. **Click on Apply.**

Caution: Wait until the QMCT1 Logical Line Actions window updates before selecting another action.

4. **Repeat Steps 2 and 3 for each test you want to run.**
5. **Click on Done.**

   The QMCT1 Port Actions window appears (refer to Figure C-3).

All changes you apply to the port via the QMCT1 Logical Line Actions window are effective only while the window is active. When you exit the QMCT1 Logical Line Actions window, all port settings revert to the original port settings.

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